A Generalized Budget Simulation Model for Aquaculture

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TEXAS A&M UNIVERSITY • SEA GRANT COLLEGE PROGRAM

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PREFACE

The Aquacultural Budget Simulator System (ABSS) enables a user to build and operate an aquaculture or mariculture facility. The physical flow of inputs into an aquaculture facility production process is simulated to produce the information required for financial reports. This system consists of two programs--a data management program (DMP) in COBOL that is used to create and update direct-access (D-A) physical inventory files, and a budget simulation program (BSP) in FORTRAN that performs all operational procedures. Part 1 of this manual describes the use of the DMP, while Part 2 describes the use of the BSP.

These D-A files provide the base data to create financial simulation of an aquacultural operation. By selecting specific items from the D-A files, the user can generate whatever financial statement may be needed with the BSP.

The primary use of the ABSS will be to create budgetary information to aid potential investors in decision-making and to provide a tool for economic research efforts concerning aquaculture. The combination of data entry flexibility and options provided in the program enable the ABSS to address numerous questions about an aquaculture facility. The system is limited only by the detailed nature of the data required and by the user's imagination.

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PART 1

DATA MANAGEMENT SYSTEM

INTRODUCTION

The data management program (DMP) for the Aquacultural Budget Simulation System is used to create and maintain a set of direct-access (D-A) files that contain basic data. Information in these D-A files will tend to become obsolete over time, and periodic reviews will be required to ensure that the data values are current. Certain values may need to be updated, new records may need to be added to the files and old records may need to be deleted. The DMP has been written to provide this flexibility and to facilitate anticipated changes in the structure and content of the D-A files.

Data Management Program Options

The DMP options available with the Aquaculture Budget Simulation System (ABSS) are:

1. Creation of the D-A files.
2. Addition of records to a D-A file.
3. Replacement of a particular record in a D-A file with an entirely new record.
4. Deletion of records from a D-A file.
5. Changes to a specified field within a particular record in a D-A file while retaining original value in all other fields in the record.
6. Current Status reports or lists of the contents of a D-A file.

7. Out-of-date Status reports for records in the D-A files when it is necessary to check the validity of the information.

8. Multiple Combination of options 2 through 7.

9. Stored Budget master file deletion check.

Control Stream

The user has to construct a control stream (card deck) that consists of a date card, control cards and data cards to implement one or a combination of the DMP options. This control stream designates the options that are to be employed.

Date Card

A date card must be at the beginning of any control stream. The control stream can contain many control cards and data cards, but only one date card. The date card format is as follows:

		Card Column	Format
Date Card	DATE:	1-5	X(5)
	Month (Jan = 01, Feb = 02, etc.) Note: Do not leave column 8 blank. Ex. 01 not _1.	8-9	XX
	Year (1980 = 80, 1981 = 81, etc.)	11-12	XX

Control Cards

A control card contains the name of the D-A file to be used followed by the type of option to be performed upon it. The D-A file name is abbreviated to a six-character word, as shown in Table 1. The selected option is a three-character word, as shown in Table 2.

Data Cards

Depending on the type of option desired, the control card may be followed by one or more "record-data cards." Options to create, add and

Table 1. D-A File Names for Use on Control Cards

D-A File	Control Card Abbreviation	Code Reference by BSP
Equipment and Supplies File	EQPSPL	1
Machinery File	MACHIN	3
Pump Unit File	PUMPCM	8
Power Unit File	POWERC	6
Variable Unit Price File	PRICEV	7
Overhead Costs File	OVERHD	4
Harvest Price File	HARVST	2
Parameter File	PARMTR	5

Table 2. Options Available for Management of D-A Files

Option Type	Control Card Abbreviation
Creation of D-A file records (requires record-data cards)	CRE
Addition of D-A file records (requires record-data cards)	ADD
Replacement of D-A file records (requires record-data cards)	REP
Deletion of D-A File records	DEL
Changes to a field within a D-A file record	CHA
Current status report for a D-A file	LST
Out-of-date status report	STA

replace require data cards; delete, change, current status and out-of-date status do not. Tables 3A through 10A give the record-data cards format and content for the D-A files. Tables 3B through 10B give example output for the D-A files. Once all the required record-data cards for a selected option have been specified, another control card may be specified followed by more record-data cards (if required). This sequence may be repeated as many times as needed. This comprises the control stream.

If the option being used requires record-data cards, special notice should be taken of the "record flag" in columns 1 and 2 of each record-data card. If there is only one data card per D-A file record, the record-data cards following each control card should be set up as follows:

Record	Card	Columns
		1 2 3 ... 80
1	1	* .....
2	2	**.....
3	3	**.....
⋮	⋮	⋮

If there are two data cards per D-A file, the record-data cards following each control card should be set up as follows:

Record	Card	Columns
		1 2 3 ... 80
1	1	* .....
	2	.....
2	3	** .....
	4	.....
3	5	** .....
	6	.....
⋮	⋮	⋮

Thus, the first record-data card after the control card has an asterisk only in column 1, and each succeeding record has an asterisk in columns 1 and 2.

Control Stream Construction

The following instructions guide the user in constructing the control stream for each option.

Option 1 - Creation of a D-A File

		Card Columns	Format
Control Card	ABS	1 - 3	XXX
	File name (refers to Table 1 for the appropriate file)	5 - 10	X(6)
	CRE	12 - 14	XXX
Data Card(s) (Record-Data Cards)	Refer to Tables 3A-10A for the data format found on these cards. If the file contains two cards per record, both must be included. The row numbers must uniquely determine where a record is located within a file.		

Option 2 - Addition of Record(s) to a D-A File

		Card Columns	Format
Control Card	ABS	1 - 3	XXX
	File name (refer to Table 1 for appropriate file).	5 - 10	X(6)
	ADD	12 - 14	XXX
Data Card(s) (Record-Data Cards)	Refer to Tables 3A-10A for the data format found on these cards. If the file contains two cards per record, both must be included. The program will assign row numbers relative to first empty record location.		

Option 3 - Replacement of Particular Record(s) in a D-A File with Entirely New Record(s)

		Card Columns	Format
Control Card	ABS	1 - 3	XXX
	File code name (refer to Table 1 for appropriate file).	5 - 10	X(6)
	REP	12 - 14	XXX
Data Card(s) (Record-Data Cards)	Replacement of records enables the user to add a completely new record specified by the row number on the data card. The record existing at the specified location prior to the replacement is over-written with the new information. Refer to Tables 3A-10A for the data format found on these cards.		

Option 4 - Deletion of Record(s) from a D-A File

		Card Columns	Format
Control Card	ABS	1 - 3	XXX
	File code name (refer to Table 1 for appropriate file).	5 - 10	X(6)
	DEL	12 - 14	XXX
	Row number of first record to be deleted (right justify).	16 - 19	9(4)
	THRU	21 - 24	X(4)
	Row number of last record to be deleted (right justify).	26 - 29	9(4)

NOTE: To delete a single record, card columns 21 through 29 must be left blank.

Option 5 - Changes to a Specified Field within a Particular Record in a D-A File

		Card Columns	Format
Control Card	ABS	1 - 3	XXX
	File code name (refer to Table 1 for appropriate file).	5 - 10	X(6)
	CHA	12 - 14	XXX
Data Card	Record-flag	1 - 2	XXX
	Row number to be changed (right justify).	3 - 6	9(4)
	Field number to be changed. These field numbers for each file are given in Tables 3A through 10A (right justify).	8 - 9	99
	1. Changes to integer values: right justify.	11 - 17	9(7)
	2. Changes to decimal values: put the decimal in column 18.	11 - 25	9(7).99
	3. Changes to character values: left justify.	11 - 70	X(60)

Option 6 - Current Status Report or List of the Content of a D-A File

		Card Columns	Format
Control Card	ABS	1 - 3	XXX
	File code name (refer to Table 1 for appropriate file).	5 - 10	X(6)
	LST	12 - 14	XXX

Option 7 - Out-of-date Reports in the D-A Files When Necessary to Check Validity of Information Maintained in the Files

		Card Columns	Format
Control Card	ABS	1 - 3	XXX

File code name (refer to Table 1 for appropriate file).	5 - 10	X(6)
STA	12 - 14	XXX

Option 8 - Multiple Options

Multiple options can be run for options 2 through 7. Use the "date card" once and arrange the options in the desired order.

Option 9 - Stored Budget Master File Deletion Check

This option is invoked automatically when Option 4 is used. Whenever a record is deleted from a D-A file, a check is made against the Stored Budget Master File (discussed in Part II) to find which, if any, of the stored budgets used the deleted records. If the deleted record is replaced with another record not having the same logical definition, the stored budget will be employing nonsensical data producing obvious results. Therefore, when Option 4 is used, the output will contain a list of the records deleted and the locations within the Stored Budget Master File (if any) that the deleted records were found.

Table 3A. Data Input Format for records in the Equipment File (EQPSPL)

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
1		Record flag	1 - 2	XX
		Row number	3 - 6	9(4)
	1	Name	8 - 39	X(32)
	2	Initial list price	41 - 46	9(6)
	3	Life	48 - 49	99
	4	Salvage percent	51 - 54	9.99
	5	Repair percent	56 - 59	9.99
		Month information was entered	61 - 62	99
		Year information was entered	64 - 65	99
	6	Frequency at which information needs to be checked for validity	67 - 68	99
	7	Information location code	70 - 73	9(4)

*Example data file printout is found in Table 3B.

Table 4A. Data Input Format for records in the Machinery File (MACHIN)

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
I		Record flag	1 - 2	XX
		Row number	3 - 6	9(4)
	1	Name	8 - 39	X(32)
	2	Initial list price	41 - 46	9(6)
	3	Fuel consumption multiplier	48 - 51	9.99
	4	Lube cost multiplier	53 - 56	9.99
	5	Repair constant I	58 - 61	9.99
	6	Repair constant II	63 - 70	9.9(6)
	7	Repair constant III	72 - 74	9.9
II	8	Hours used annually	1 - 6	9(6)
	9	Years owned	8 - 9	99
	10	Hours of life	11 - 16	9(6)
	11	Annual repair percent	18 - 21	9.99
	12	Salvage	23 - 26	9.99
		Month information was entered	28 - 29	99
		Year information was entered	31 - 32	99
	13	Frequency of validity checks	34 - 35	99
	14	Information location code	37 - 40	9(4)

*Example data file printout is found in Table 4B.

**(2 cards per record).

Table 5A. Data Input Format for records in the Pump Unit File (PUMPCM)

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
I		Record flag	1 - 2	XX
		Row number	3 - 6	9(4)
	1	Pump type	8 - 9	99
	2	Pump description	11 - 42	X(32)
	3	Gallons per minute	44 - 49	9(6)
	4	Initial list price	51 - 56	9(6)
		Month of entry/update	58 - 59	99
		Year of entry/update	61 - 62	99
	5	Frequency of validity checks	64 - 65	99
	6	Information location code	67 - 70	9(4)

*Example data file printout is found in Table 5B.

Table 6A. Data Input Format for records in the Power Unit File (POWERC).

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
I		Record flag	1 - 2	XX
		Row number	3 - 6	9(4)
	1	Fuel type	8 - 9	99
	2	Power unit description	11 - 42	X(32)
	3	Horsepower	44 - 49	9(6)
	4	Initial list price	51 - 56	9(6)
		Month of entry/update	58 - 59	99
		Year of entry/update	61 - 62	99
	5	Frequency of validity checks	64 - 65	99
	6	Information location code	67 - 70	9(4)

*Example data file printout is found in Table 6B.

Table 7A. Data Input Format for records in the Variable Unit Price File (PRICEV).

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
I		Record flag	1 - 2	XX
		Row number	3 - 6	9(4)
	1	Price description	8 - 39	X(32)
	2	Price	41 - 49	9(6).9(2)
		Month of entry/update	51 - 52	99
		Year of entry/update	54 - 55	99
	3	Frequency of validity checks	57 - 58	99
	4	Information location code	60 - 63	9(4)

*Example data file printout is found in Table 7B.

Table 8A. Data Input Format for records in the Overhead Costs File (OVERHD).

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
I		Record flag	1 - 2	XX
		Row number	3 - 6	9(4)
	1	Overhead cost description	8 - 39	X(32)
	2	Frequency code	41 - 42	99
	3	Cost value	44 - 49	9(6)
		Month information was entered	51 - 52	99
		Year information was entered	54 - 55	99
	4	Frequency of validity checks	57 - 58	99
	5	Information location code	60 - 63	9999

*Example data file printout is found in Table 8B.

Table 9A. Data Input Format for records in the Harvest Price File (HARVST).

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
I		Record flag	1 - 2	XX
		Row number	3 - 6	9(4)
	1	Harvest species code	8 - 9	99
	2	Size code	11 - 12	99
	3	Name	14 - 45	X(32)
		Month information was entered	47 - 48	99
		Year information was entered	50 - 51	99
	16	Frequency of validity checks	53 - 54	99
	17	Information location code	56 - 59	9(4)
II	4	Price 1	1 - 5	99.99
	5	Price 2	7 - 11	99.99
	6	Price 3	13 - 17	99.99
	7	Price 4	19 - 23	99.99
	8	Price 5	25 - 29	99.99
	9	Price 6	31 - 35	99.99
	10	Price 7	37 - 41	99.99
	11	Price 8	43 - 47	99.99
	12	Price 9	49 - 53	99.99
	13	Price 10	55 - 59	99.99
	14	Price 11	61 - 65	99.99
	15	Price 12	67 - 71	99.99

*Example data file printout is found in Table 9B.

**(2 cards per record).

Table 10A. Data Input Format for records in the Parameter File (PARMTR).

CARD	FIELD NUMBER	CONTENTS	COLUMNS	FORMAT
I		Record flag	1 -	XX
		Row number	3 - 6	9(4)
	1	Parameter description	8 - 39	X(32)
	2	Parameter value	41 - 52	9(7).9(4)

*Example data file printout is found in Table 10B.

DIRECT-ACCESS FILES

This section describes the data in each D-A file. File descriptions and format are given in Tables 3A through 10A. Computer print-outs of the D-A files are in Tables 3B through 10B. The file records contain cost and technical data, and each record also contains a location for file row number, item description and update information. Tables 3B through 10B should be referenced for the following discussion.

File Description

Each D-A file contains a series of records. The BSP accesses a given record by referring to its explicit row number. Each record contains information related to the description of that item. Users must supply descriptions that are specific enough to be identifiable for successful operation of the budget simulation system. For example, when entering a machine item in the machinery file, one should use a name adequate enough to correspond uniquely to the purchase price and technical values associated with that particular machinery item.

The update information contains three fields. The first field indicates the month and year of the most recent data collection. The second specifies the number of months that may elapse before the data should be checked against current market prices. The third is a location code for the sources, especially prices, which are then assigned a code of up to four digits. This code is used to locate the data source and to update

the information. The data source is simply a list of names, addresses and telephone numbers that the user will keep in a separate notebook.

D-A File Contents

Equipment File

The equipment file contains a broad range of items, from major implements to test tubes, that have a useful life of more than one year and are depreciated. (Note: Self-powered machinery goes in the Machinery file; water pumps go in the Pump and Power unit files; inputs that can be purchased in variable quantities, such as land, building, hourly labor, feed, etc., go in the Input Price file; salaried employees, licenses, etc., go in the Overhead file.) The number of units needed to construct a budget is given in the BSP. Table 3B illustrates an equipment file. It contains information in fields 1 through 9 about equipment and supplies that are stored in the D-A file. The second field contains a 32-character "Item Description" for the piece of equipment or supply item. This description must be unique for each item. "Initial Price" in field 3 is the actual unit price of the item. Quantities of each item are entered in the BSP. "Years Owned" in field 4 is the actual useful life of the item, and is used for depreciation and loan computation. "Salvage Percent" is the percentage of the initial price that is to be claimed as scrap at the end of the useful life of the item. "Repair Percent" is the estimated annual repair and maintenance cost as a percent of the intitial price of the item.

Machinery File

Table 4B contains price information for power machinery items. The quantity of items is entered in the BSP. Machinery is defined as powered

machinery such as trucks, tractors, feed blowers, etc. Additional information found in the file is used primarily to estimate fuel and repair costs, if needed, for each piece of machinery selected.

Field 1 contains a 32-character description of the item. Field 2 contains the initial price of the item. Fuel can be calculated in two ways. The first way is to use the "fuel multiplier" found in field 3. Depending on the type of fuel used, this value gives fuel consumption in gallons per hour per $1,000 of original unit price for the item. The equation for calculating fuel is

Gallons/Mo = Initial price X hours used annually X monthly percentage factor X fuel multiplier/1000

where the monthly percentage factor is given in the BSP. Notice that field 8 requires hours used annually. Derived values for the fuel multiplier for tractors, trucks and pick-ups for various fuel types are as follows:

	Gas	LPS	Diesel
Tractor	.69	.76	.44
Truck	.69	.76	.44
Pick-up	.69	.76	.44

Field 4 contains the "lube multiplier" which gives an estimated oil and filter cost as a percentage of total fuel costs[1]. The second way to calculate fuel is handled entirely in the BSP through the VARC agendum.

There are two methods to calculate repairs. The first requires fields 5 through 10. The equation is:

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[1]These and other values are documented in the Oklahoma State University research report P-719, "Operations Manual for the Oklahoma State University Enterprise Budget Generator."

Repairs in time period t = (Accumulated repairs time period t) - (Accumulated repairs time period t-1).

where

Accumulated Repairs to time period t = Initial price X Repair constant 1 X Repair Constant 2 $X\left(\text{Percentage of life used up}_{X100}\right)$ Rep. Cons.3

Percentage of life used up = Total number of hours of life of/hours of life item used up

Total number of hours of life of item used up = Summation of hours used annually up to current

This first method is documented in the user manual by Kletke at Oklahoma State University.

The second method calculates repairs as a percent of intitial price using fields 2 and 11. Field 13 is the estimated salvage value of the item given as a percentage of original unit price.

Pump Unit File

Table 5B contains information about the pump units. Given the information in the file, the user can either (1) select the desired pump(s) directly from the file, or (2) allow the simulator to generate water exchange values internally and use these values to select a pump(s) from the file.

Field 2 contains a "type" code for the pump. The coding system is as follows:

1 - extended shaft

2 - portable hydraflow

3 - deep well turbine

Field 3 contains the item description, which must include the gallon per-minute (GPM) rating of the pump. Field 4 contains the maximum rated

gallon-per-minute capacity of the pump. Field 5 contains the initial price of the pump.

This information should be sorted by type code and GPM if employed as user option 2. The GPM values should be in ascending order. Then, if user option 2 is utilized, the user supplies the "type" of pump needed and the simulator will compute the necessary GPM for water exchange purposes. A match then will be found between "type" code and GPM and a unique pump price will be specified. If user option 1 is selected, the user simply selects the row number of the desired pump(s) directly from the file.

Power Unit File

Table 6B contains information on pump drivers needed to power the pump(s) selected. As with the pump file, the user has two options. The format of the data in the file and the use of the information by the simulator is identical with the pump file except that the file is sorted by engine type and purchase horsepower (HP). The engine "type" code system is as follows:

1 - Diesel

2 - Gasoline

3 - Butane

4 - Electric

The purchase HP value represents the horsepower value found in sales data for the unit.

Variable Unit Price File

Table 7B contains fields 1 through 6 pertaining to unit prices used by the model. The prices apply to a wide range of items, i.e., variable

input, building space-per square foot, seed stock, etc. The second field contains the 32-character item description. The third field contains the actual unit price.

Overhead Costs File

Table 8B contains information on the overhead costs incurred by the operation. Field 2 contains the 32-character description of the item. Field 3 contains the number of times the cost is incurred per typical year. Field 4 contains the actual value of the item.

Harvest Price File

Table 9B contains the information on monthly prices for the system output. The prices can be given for various sizes per species. Field 2 contains a species code. This may not be unique to species (i.e., fresh vs. frozen salmon). Field 3 contains a size code. This size numbering system, sorted in ascending order, represents a size distribution that is assumed for the production. Field 4 contains a unique 32-character description of the product, which should include species and size. The description also should contain the unit of output (i.e., per pound, per each, per 100 ct., etc.). Fields 15 and 16 contain monthly prices for the product (beginning with January in field 5). If no variation in prices across months is assumed but size distribution is assumed, the same price for each size should occur for every month. If size distribution is not assumed (one average size for the species), there should be one row of prices with a size code of 1 for the species.

Parameter File

Table 10B contains the miscellaneous percentages, coefficients, parameters, rates and other values used by the BSP. The file must be

created initially with all the values being found in the file in their specific rows. The values may be changed in value, but not in logical definition or in the row in which they appear for rows 1 through 48. Values may be added to the end of the file (after row 48) in available space, but values can never be inserted. The location of items in rows 1 through 48 can never be altered. The values are used in various equations throughout the BSP. Field 2 contains the value description and field 3 contains the actual value.

Table 3B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-MO1-133
CURRENT STATUS OF - EQUIPMENT AND SUPPLIES FILE

ROW NBR	ITEM DESCRIPTION	INITIAL PRICE	YEARS OWNED	SALVAGE PERCENT	REPAIR PERCENT	UPDATE INFORMATION		
1	ICE MACHINE	1920	8	0.05	0.01	3/81	12	1
2	MAGNETIC STIRRER/HEAT FISHER79	148	3	0.00	0.00	3/81	12	1
3	AERATION BLOWER SPENCER TURBINE	602	5	0.00	0.01	3/81	12	1

SUMMARY: MAXIMUM FILE SIZE = 500
NUMBER OF RECORDS IN FILE = 3

Table 4B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-MO1-133
CURRENT STATUS OF - MACHINERY FILE

ROW NBR	ITEM DESCRIPTION	INITIAL PRICE	FUEL MULT	LUBE MULT	REP1	REP2	REP3	ANNUAL HOURS	LI FE	HRS IN LIFE	REP %	SAL %	UPDATE INFORMATION		
1	AUTOMOBILE/STATIONWAGON	11000	0.00	0.00	0.00	0.000000	0.0	0	5	0	0.05	0.02	3/81	12	1

SUMMARY: MAXIMUM FILE SIZE = 500
NUMBER OF RECORDS IN FILE = 1

Table 5B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-M01-133
CURRENT STATUS OF - PUMP UNIT FILE

ROW NBR		ITEM DESCRIPTION	GALS/ MIN	INITIAL PRICE	UPDATE INFORMATION		
1	1	EXTENDED SHAFT/AXIAL,2000GPM	2000	8500	3/81	12	1
2	2	HYDRAFLO/2000GPM	2000	9850	3/81	12	0

SUMMARY: MAXIMUM FILE SIZE = 250
NUMBER OF RECORDS IN FILE = 2

Table 6B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-M01-133
CURRENT STATUS OF - POWER UNIT FILE

ROW NBR		ITEM DESCRIPTION	HP	INITIAL PRICE	UPDATE INFORMATION		
1	1	DIESEL/CATERP.200HP,4CYL,2STR	200	5000	3/81	12	1
2	2	GASOLINE/DEERE,160HP,4CYL,4STR	160	2800	3/81	12	1

SUMMARY: MAXIMUM FILE SIZE = 250
NUMBER OF RECORDS IN FILE = 2

Table 7B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-MO1-133
CURRENT STATUS OF - PRICE FILE

ROW NBR	ITEM DESCRIPTION	UNIT PRICE	UPDATE INFORMATION		
1	LABOR/PART TIME/MONTH	700.00	3/81	12	1
2	LAND TEXAS COAST	1500.00	3/81	12	1
3	BUILDING/SQ FT	40.00	3/81	12	1
4	FUEL UNLEADED/GAL.	1.18	3/81	12	1
5	BROODSTOCK RESTOCK 280/4 MO.	40.00	3/81	12	1
6	SQUID FEED/LB	0.75	3/81	12	1
7	PETRI DISHES	100.00	3/81	12	1
8	OXYGEN REFILL/SHIPPING	8.50	3/81	12	1

SUMMARY: MAXIMUM FILE SIZE = 1000
NUMBER OF RECORDS IN FILE = 8

Table 8B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-MO1-133
CURRENT STATUS OF - OVERHEAD FILE

ROW NBR	ITEM DESCRIPTION	FREQ	VALUE	UPDATE INFORMATION		
1	PERMIT FOR BUILDING	1	148	3/81	12	1
2	MANAGER'S MONTHLY SALARY	12	2000	3/81	12	1
3	ASSNT MANAGER'S MONTHLY SALARY	12	1500	3/81	12	1

SUMMARY: MAXIMUM FILE SIZE = 250
NUMBER OF RECORDS IN FILE = 3

Table 9B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-M01-133
CURRENT STATUS OF - HARVEST PRICES FILE

ROW NBR	ITEM DESCRIPTION	MONTHLY PRICES JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	UPDATE INFORMATION		
1 1 3	PENAEUS NAUPLII (PRICE/1000)	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	1.55	3/81	12	1

SUMMARY:
MAXIMUM FILE SIZE = 500
NUMBER OF RECORDS IN FILE = 1

Table 10B

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-M01-133
CURRENT STATUS OF - PARAMATER FILE

ROW NBR	ITEM DESCRIPTION	VALUE
1	HAZEN-WILLIAMS/CONCRETE PIPE	100.0000
2	HAZEN-WILLIAMS/CLAY PIPE	140.0000
3	HAZEN-WILLIAMS/STEEL PIPE	160.0000
4	HAZEN-WILLIAMS/PVC PIPE	145.0000
5	PUMP EFFICIENCY	75.0000
6	POWER UNIT EFFICIENCY	30.0000
7	POWER UNIT DRIVE EFF/DIRECT	1.0000
8	POWER UNIT DRIVE EFF/RIGHT ANGLE	0.9700
9	POWER UNIT DRIVE EFF/V-BELT	0.9500
10	POWER UNIT DRIVE EFF/FLAT BELT	0.8000
11	POWER UNIT DERATE/INTER. COMBUST	1.0000
12	POWER UNIT DERATE/ELECTRIC	0.8000
13	POWER UNIT DERATE/ACCESSORIES	0.0500
14	POWER UNIT DERATE/RADIATOR	0.0500
15	BTU/GALLON DIESEL	138000.0000
16	BTU/GALLON GASOLINE	150000.0000
17	BTU/GALLON LP	140000.0000
18	PUMP DRIVER REPAIR/HOUR/$LIST-LP	0.0007
19	PUMP DRIVER REPAIR/HOUR/$LIST-NG	0.0007
20	PUMP DRIVER REPAIR/HOUR/$LIST-DS	0.0010
21	PUMP DRIVER REPAIR/HOUR/$LIST-EL	0.0001
22	DEFAULT HOURS OF LIFE /PUMP	30000.0000
23	DEFAULT LIFE OF FACILITY STRUCT.	20.0000
24	DEFAULT SHORT TERM INTEREST RATE	0.2100
25	DEFAULT INTER TERM INTEREST RATE	0.1900
26	DEFAULT LONG TERM INTEREST RATE	0.1700
27	BUILDING INSURANCE RATE	0.0450
28	MACHINERY & EQUIPMENT INSUR RATE	0.0076
29	WORKMAN'S COMPENSATION RATE 1	8.1700
30	WORKMAN'S COMPENSATION RATE 2	100.0000
31	EMPL. SOCL. SECRTY. RATE	0.0665
32	EMPL. SOCL. SECRTY. WAGE MAX.	29700.0000
33	OWNER OPER. SOCL. SECRTY. RATE	0.0930
34	OWNER OPER. SOCL. SECRTY. INC MA	29700.0000
35	UNEMPLOYMENT TAX RATE	0.0080

-CONTINUED-

AQUACULTURE BUDGET SIMULATION SYSTEM
SEA GRANT NO. 04-8-MO1-133
CURRENT STATUS OF - PARAMATER FILE

ROW NBR	ITEM DESCRIPTION	VALUE
36	UNEMPLOYMENT INCOME MAX	6000.0000
37	PROPERTY TAX PERCENTAGE	0.2000
38	PROPERTY TAX DIVISOR	100.0000
39	PROPERTY TAX RATE	2.4400
40	INV. TAX CRDT. RATE 3-5 YR. LIFE	0.0333
41	INV. TAX CRDT. RATE 5-7 YR. LIFE	0.0666
42	INV. TAX CRDT. RATE > 7 YR. LIFE	0.1000
43	INV. TAX CRDT. LIMIT EXCSS. RATE	0.6000
44	INV. TAX CRDT. DOLLAR LIMIT	25000.0000
45	DEFAULT DISCOUNT RATE	0.1700
46	OPPORTUNITY COST % FOR EQUITY	0.1900
47	OPPORTUNITY COST FOR ENTREP	25000.0000
48	STATE TAX PERCENTAGE RATE	0.0500

SUMMARY: MAXIMUM FILE SIZE = 250
NUMBER OF RECORDS IN FILE = 48

PART 2

BUDGET SIMULATION SYSTEM

INTRODUCTION

This manual describes how to provide necessary data to the budget simulation program (BSP) in a usable format. This requires an understanding of the function of each agendum, as well as knowing how to construct a workable control-stream. Attention also is given to data requirements, computational methods employed, operational procedures, output possibilities and potential modifications to the program.

Section II discusses construction of a control-stream. Section III discusses each agendum in detail, including a brief overview of the agendum's capabilities and options, a definition of all the agendum's data, and a detailed discussion of how to use the agendum. Section IV includes examples of agendum input tables.

The BSP also can store budgets in a D-A file. Actually, a "budget" is the control-stream which creates a specific set of budgetary output. The procedure of storing, and then utilizing, stored budgets is covered in detail in Section V.

Section VI contains the appendices. Appendix A is the documentation for the "system design subroutines," and Appendix B is documentation for the growth model subroutines. Appendix C gives technical computations for such items as repairs and fuel.

CONTROL-STREAM CONSTRUCTION

The BSP controls program execution by a set of data cards known as a "control-stream." The control-stream is the set of data provided by the user, which consists of a number of subsets that individually are referred to as an agendum. Each agendum consists of an initial data card containing a four-letter "keyword." This keyword-card is followed by a set of cards which contain additional data. The main program of the BSP is designed to read the keywords found in the control-stream and transfer execution control to a subroutine. The subroutine then processes the data on the cards immediately following the agenda keyword-card, and performs a specific set of computations and/or provides output. Control is then transferred back to the control-stream where the next keyword is read.

There are 24 agenda provided for the BSP. These agenda can be further categorized into separate groups, with each group representing a specific type of computation and/or output task. Table 1 outlines the agenda groups, the specific agenda found within each group, and the four-letter keyword associated with each agendum. Some agenda may be omitted from the control-stream while others must be included. These also are indicated in Table 1.

Control-Stream Set-Up

Once the user has determined which agenda are needed and the data

Table 1. Agenda Groups

Groups of Agenda	Agendum Keyword
A. Stored Budget Group	
Stored Budget File	SBFL
Storing Budgets	SBGT
B. Heading Agenda Group	
Description Agendum	DSCR
Title Agendum	TITL*
Footnote Agendum	FTNT
Print Agendum	PRNT
C. Financial Agendum	FNCL*
D. Tax Agendum Group	
Tax Credit Agendum	TXCR
Tax Modification Agendum	TXMD
Tax Table List from D-A File	TXWR
E. Facility Structure Agenda Group	
System Design Agendum	SYSD*
Buildings Agendum	BLDG
F. Machinery and Equipment Agenda Group	
Machinery Agendum	MACH
Equipment Agendum	EQMT
Read-in Pumping Equipment Agendum	PMEN
Pumping Equipment Computed Agendum	PMPC
G. Production Agenda Group**	
Read-in Production Agendum	GROW
Production via Growth Model Agendum	PROD
H. Cost Agenda Group	
Variable Cost Agendum	VARC
Overhead Agendum	OVHD
Salary Agendum***	SLRY*
I. Output Agenda Group	
Detailed Annual Budget Agendum	BUD1
Aggregate Annual Budget Agendum	BUD2
General Annual Budget Agendum	BUD3

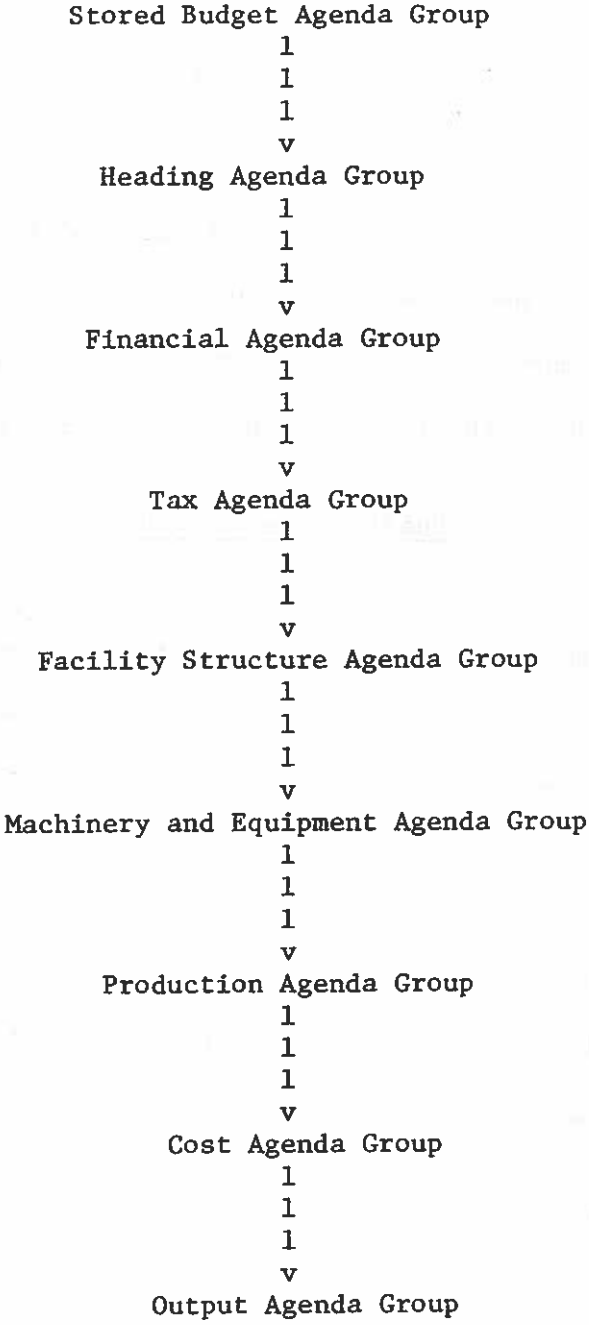
*Must be included in control-stream.
**One of this group must be included.
***Must be the last agendum used in this group.

for each have been properly coded (placed on data records), the control-stream must be constructed (agenda placed in proper order). There is a hierarchy of agenda groups in the control-stream (see Table 2) that the user must follow. Individual agenda within each group can be placed in any desired order, but the hierarchy of groups is necessary because one agenda group will produce information required by following groups for proper execution. For example, the facility structure agenda group produces values for facility size that are needed to compute yield via a growth submodel (GROW), water exchange costs (PMEN, PMPC), and output headings (output agenda group).

The user must place the agenda "end-to-end" to construct the control-stream. The first card of each agendum will be the keyword-card and the last will be the delimiter ("END*"). An exception to this rule is in the use of stored budgets, which are discussed in Section V.

The user must arrange the agenda in proper hierarchial group sequence and place the separate agendums within each group end-to-end. Following this, a card with the four-letter word "STOP" is placed at the very end of the card deck. This signals the end of the data deck and instructs the program to stop reading data cards. If the STOP card is never found, appropriate error messages will be printed and program execution will stop.

Table 2. Group Hierarchy within Control Stream



AGENDA DESCRIPTION

The following discussion of each agendum is oriented toward a general description of agendum capabilities and a detailed discussion of what data is required and how to enter the data onto cards. Corresponding tables for each agendum are in Section IV. Users should refer to these tables while following the instructions for entering data on the cards.

Heading Agenda Group

The DSCR Agendum

The DSCR agendum allows the user to enter a description of the system for which the current run will apply. This description is entirely arbitrary, but it should apply solely to the system design, production scheme, location, etc.

Up to a maximum of 50 lines of 80 characters or less can be entered for the description. Numeric and/or character data may appear. Blank cards can be used to provide spacing in the description. The output is limited to one page. This agendum can be omitted if no system description is desired. Refer to Table 6.1.

The TITL Agendum

The TITL agendum allows the user to read-in the system title/description found in all output headings. This title should be concise and unique to the system.

The title must be contained on one card and consist of 80 characters

or less, and it may be character as well as numeric. This agendum should be included in the control-stream. Refer to Table 6.2.

The FTNT Agendum

The FTNT agendum allows the user to create a footnote which will appear on the bottom of the requested output. The footnote may contain whatever information is desired, but it is limited to three lines of 80 characters or less. Numeric and/or character data may appear. If no footnote is desired, simply omit this agendum. Refer to Table 6.3.

The PRNT Agendum

The PRNT agendum, although included in the Heading Agenda Group, actually allows the user to control printed output except with annual budgets. Zero (or blank) suppresses the printing of a specified output and 1 (one) allows it. Refer to Table 6.4.

Financial Agendum

The FNCL Agendum

The FNCL agendum is a two-card agendum that allows the user to provide various data items that are to be used throughout the BSP. It is called a FINANCIAL agendum because most of the information inputted by it relates to the financial or accounting function of the BSP. To complete the agendum, the user must consider the option of overriding default information found in the D-A PARMTR file. The user must refer to this file to determine whether the default values are sufficient to avoid invoking the options.

The FNCL agendum must be included in the control-stream. All optional values are left blank if not used. The second card is optional and may be omitted. Refer to Table 6.5.

Data Card 1 -- The user first must make a few basic decisions about the assumptions of the analysis, such as the budget planning horizon, object year of analysis, etc. Variables PLNHRZ, OBJTYR, BEGIN, ISTACD and TAXCOD are used for this purpose. The accompanying discussions in Section IV are self-explanatory.

MINBAL refers to the minimum cash balance allowed. If the cash balance is ever less than this amount, a short-term loan will be taken out to finance the difference.

Variables MTHDOP and PCDOWN are used if the depreciation method and down payment percentage of initial cost are to be the same for all capital items specified. This means that the depreciation method and down payment percentage cannot be respecified throughout the remaining agenda. If this level of generality is not desired, the method and percentage must be given for each specific capital item in the appropriate agenda and MTHDOP and PCDOWN are left blank. Either or both of these options can be used, with the above logic applying whether used singularly or in combination. If either or both items are left blank, the respective default values will be used unless further options are employed in other specific agenda.

Variable IVESTX allows the user to specify whether investment tax credits are to be claimed for all capital items. This applies to all capital items selected in subsequent agenda. Variable IOPFP2 allows the user to specify a loan repayment schedule for all loans. Default is monthly so the user should refer to Table 5.02 for alternatives.

Variables XINTS, XINTM and XINTL are used to override short-, medium- and long-term interest rates, respectively. The BSP uses the

appropriate interest rate (based on the economic life of the item either entered as data or read from the D-A file for each capital item) to compute loan costs. The range of years in the life of a capital item and the corresponding interest rate designation is as follows:

Life	Interest Rate
<1 year	Short-term (XINTS)
2 - 5 years	Intermediate-term (XINTM)
>5 years	Long-term (XINTL)

The user may elect not to finance any capital item. This is done within each agendum where capital items are specified. The user must have enough cash in the beginning cash balance (BEGIN) to cover the cost of all capital, however, or the BSP will use short-term borrowing to cover the cost not included in BEGIN.

Variables STAPCT, RATE7 and INSUR2 are self-explanatory. The discount rate is used to compute the NPV of the operation and is displayed with the annual cash flow. Building insurance is computed for all buildings.

Data Card 2 -- Variables INSUR2, INSUR3 and INSUR4 are optimal values used to compute equipment and payroll insurance. Variables RATE3, RATE4 and RATE5 are used to compute annual business property tax. The taxes are computed as follows:

Annual Property = ITVAL * RATE3/RATE4 * RATE5

where ITVAL is the total depreciated property (capital) value for a given year (computed by BSP). Variable IENTRT is used to compute "pure economic profit" on the annual budget. The returned to entrepreneurship, as well as returned to equity, capital is subtracted from net returns before tax.

Tax Agenda Group

The TXCR Agendum

The TXCR agendum allows the user to create or completely replace the tax table to calculate federal income taxes. This agenda will automatically print out the tax table. The data appears on 22 cards following the TXCR card. All 22 cards must be included, even if they are left blank. Each card contains a row number of the row in the tax table where the tax data will be stored. The other three items on each card are the maximum income level, the base tax and percentage of tax on income over the initial income level. Refer to Table 6.6.

The program's calculation of federal taxes compares the net income with the maximum income level stored in the tax table until the net income falls above the preceding row's maximum income and below the current row's maximum income level. At this point, the maximum income level of the preceding row is subtracted from the net income. Tax is calculated by applying the percentage rate found in the current row to the remainder, and adding that result to the base value in the current row. Refer to Table 3 for an example of how to create the tax table and how the calculations work.

Using 1980 rates for a married sole proprietor with no dependents, the IRS tax schedule for corporate income tax would resemble Table 3A. The correct entry of this data into the tax table (using rows 1 through 5 for corporate tax data and rows 7 through 22 for sole proprietor) appears in Table 3B. Table 4 is a listing of the data in the D-A TAXTBL file.

As an example, a sole proprietor with a net taxable income of $25,000 would calculate the tax using the base value of $4,505 found on card (row

Table 3. Federal Income Tax Schedules

A. Corporate Income Tax

Taxable Income	Tax Percentage
< 25000	17 %
$25001 - 50000	20 %
$50001 - 75000	30 %
$75001 -100000	40 %
>100000	46 %

B. Sole Proprietor Tax Schedule

Schedule II. Married Taxpayers Filing Joint Returns, and Certain Widows and Widowers.

If the amount of Taxable income is Over-	But Not Over-	The tax is	Of Excess Over-
$ 3,400	$ 5,500.....	$ 0 plus 14%	$ 3,400
$ 5,500	$ 7,600.....	$ 294 plus 16%	$ 5,500
$ 7,600	$ 11,900.....	$ 630 plus 18%	$ 7,600
$ 11,900	$ 16,000.....	$ 1,404 plus 21%	$ 11,900
$ 16,000	$ 20,200.....	$ 2,265 plus 24%	$ 16,000
$ 20,000	$ 24,600.....	$ 3,273 plus 28%	$ 20,200
$ 24,600	$ 29,900.....	$ 4,505 plus 32%	$ 24,600
$ 29,900	$ 35,200.....	$ 6,201 plus 37%	$ 29,900
$ 35,200	$ 45,800.....	$ 8,162 plus 43%	$ 35,200
$ 45,800	$ 60,000.....	$ 12,720 plus 49%	$ 45,800
$ 60,000	$ 85,600.....	$ 19,678 plus 54%	$ 60,000
$ 85,600	$ 109,400.....	$ 33,502 plus 59%	$ 85,600
$ 109,400	$ 162,400.....	$ 47,544 plus 64%	$ 109,400
$ 162,400	$ 215,400.....	$ 81,464 plus 68%	$ 162,400
$ 215,400	.....	$ 117,504 plus 70%	$ 215,400

Table 4. Direct-Access File Data Entry - Tax Table

Field 1 Row #	Field 2 Max Income	Field 3 Base Value	Field 4 % Rate
1	0	25000	17
2	25001	50000	20
3	50001	75000	30
4	75001	100000	40
5	100001	0	46
6			
7	3400	0	0
8	5500	0	14
9	7600	294	16
10	11900	630	18
11	16000	1404	21
12	20200	2265	24
13	24600	3273	28
14	29900	4505	32
15	36200	6201	37
16	45800	8162	43
17	60000	12720	49
18	85600	19678	54
19	109400	33502	59
20	162400	47544	64
21	215400	81464	68
22	9999999	117504	70

number) 14, field 3 of the tax table. The maximum income from the preceding card (row) would be subtracted from $25,000 to obtain a difference of $400. This $400 is multiplied by the percentage value found in the fourth field of card (row) 14. The result of $128 is then added to the base value, $4,505, to yield the tax obligation of $4,633. Income taxes are deducted in April of the following year.

The TXMD Agendum

The TXMD agendum allows the user to modify specific rows in the tax table that need updating. Up to 22 cards can be used to enter the row in the tax table to be changed and update information on initial

income level, base tax and percentage. The tax calculation procedure described previously remains the same. Refer to Table 6.7.

The TXWR Agendum

The TXWR agendum writes the tax table from the direct-access file to I-O unit 6. The user can review current tax information and make necessary changes with either the TXCR agendum for complete revamping or the TXMD agendum for minor changes. Refer to Table 6.8.

Facility Structure Agenda Group

The SYSD Agendum

The SYSD agendum enables the user to describe the general design and layout of the facility to the simulator (i.e., total acreage, total water surface acreage, total water volume, etc.) and to account for the costs of actually constructing the physical facility (i.e., land, ponds, roads, levees, etc.). For example, costs relative to earth movement, materials used in road construction, levee stabilization, land clearance, land acquisition costs per acre, etc., can be dealt with by employing the SYSD agendum.

Design and cost information can be handled by the BSP in two ways. Externally generated information can be read in from cards, or a subroutine (of the user's design or one already contained in the simulator) can be used to compute the values. Each option is a separate subagendum. The SYSD agendum must be in the control-stream with one of the two subagendums. Refer to Table 6.9.

Option I: The GIVN subagendum -- The GIVN subagendum allows the user to simply read-in the values necessary for the SYSD agendum. Employing this subagendum assumes, of course, that these values have been com-

puted externally. Any number of values for construction costs can be entered. This subagendum uses the D-A PRICEV file. The user should be familiar with the contents of this file before using this subagendum.

Data Card 1

Technical data and earnings data for agricultural facilities are commonly expressed on a per technical unit basis (e.g., per acre, per hectare, etc.). Data Card 1 allows the user to describe the technical unit of the aquacultural/maricultural operation in these terms in the budgetary output (e.g., per surface acre, per pond, etc.). Variable TEDSCR is used for this purpose. Variable SIZE is used to denote the total number of technical units contained in the facility in question. For example, if the facility contains 96 acres of total area (land and water), the output will be on a per acre basis.

Data Card 2

This card is used to input the various types of items used in constructing the production facility. For example, if a certain quantity of gravel is used in construction, the user selects the appropriate price from the D-A PRICEV file. The user then specifies the quantity, life etc., for the item. Price and quantity must be on the same unit basis. Variables CONTROL, IROW, NUMBER, LIFE, YURCST, SALVAG and DBLPCT are self-explanatory. If the user refers to the D-A PRICEV file and does not find an appropriate price, an optional price can be entered. If YURCST is used, IROW should be left blank, since no row in the D-A PRICEV file is applicable. The user should be cautious in using variables METHOD and PCDOWN. These should be left blank if the optional variables MTHDOP and PCDOWN of the FNCL agendum were used.

Option II: The CALC Subagendum -- The CALC subagendum allows the user to employ a subroutine to compute all the values that otherwise would have to be read in using the GIVN subagendum. A more detailed discussion of this subagendum is included in Appendix A.

If the user specifies the CALC subagendum, the simulator uses a subroutine to compute the values which are read in when using the GIVN subagendum. This subroutine (one of a library of such possible subroutines) is called a system design subroutine. The user first must refer to Appendix A and determine if a subroutine exists in the program library (which should be specific to a given BSP installation) that performs the desired computations. If such a subroutine is not found, the user must enter his own subroutine. Each subroutine must compute the two distinct types of information as discussed in the SYSD introduction. The subroutine must compute facility size values, such as total land area, total water surface area and maximum total water volume, as standard information. There is a standard set of values that each system design subroutine must compute and store in a vector in the order shown in Table 5.11. Other similar information can be generated (Appendix A). These individual items are stored as a vector with each element given a corresponding item-code value. The subroutine also must compute the quantities of construction inputs such as specified by the set of data card 2's of the GIVN subagendum. The values are computed by the subroutine and stored in an additional vector "B" in a given order with a corresponding item code-value for each element. The user should refer to the documentation of a general system design subroutine in Appendix A before attempting to complete the CALC subagendum. This subagendum uses the D-A PRICEV file,

so the user should be familiar with this file's contents before using this subagendum. Basically, the BSP multiplies the input quantities found in vector "B" with the appropriate per unit price in the D-A PRICEV file to obtain total cost of facility construction.

Data Card 1

By referring to Table 5.10 the user will obtain the library code for his specific subroutine. This value is entered as variable IROWD on data card 1. By referring to the documentation of the selected subroutine (which is to be used to obtain, update or create), the user must select one of the values for facility size produced by the subroutine and stored in vector "A." The I-code value associated with this element is entered as variable RESULT. After selecting the facility size needed, the user should enter the corresponding technical unit description, such as acre, surface-acre, etc. This is entered as variable TEDSCR.

Data Card 2

Referring to the documentation for the selected subroutine, the user must enter the information needed to run the subroutine. This information can take any number of cards, which, collectively, are referred to as data card 2. Each card may contain real as well as integer data. An example of a system design subroutine is used in the CALC subagendum in Section IV, complete with the appropriate set of data card 2's (two of which were needed). This system design subroutine is found in the library and is given a library code of "1." This subroutine is designed for a pond system consisting of two rows of identical ponds. The user simply provides the informa-

tion requested on the two data card 2's to obtain the cost of constructing the facility. A more thorough discussion is included in Appendix A.

Data Card 3

The information on this card relates to the per unit price of each item found in vector "B." There is a data card 3 for each item in vector "B." Since each card contains the per unit price of each corresponding element in vector "B,", the data card 3's must be in the appropriate order. Variables on data card 3 are interpreted just as those on data card 2 in the GIVN subagendum, except that in the CALC subagendum the variable NUMBER is missing. This is because the quantity of each item is computed by the system design subroutine employed in CALC while NUMBER is computed externally in the GIVN subagendum.

The BLDG Agendum

The BLDG agendum allows the user to enter building and miscellaneous costs necessary for the production facility. This can include whatever type of building(s) are appropriate. This agendum can be omitted if costs are computed by the CALC subagendum or if no buildings are necessary. This agendum uses the D-A PRICEV file. Refer to Table 6.10.

Data Card 1 -- The variables found on this card are interpreted just as those on data card 2 of the SYSD/GIVN subagendum. The user should use as many cards as needed.

Machinery and Equipment Agenda Group

The EQMT Agendum

The EQMT agendum enables the user to select the equipment (tools, hardware, etc., but not major machinery) needed for the operation from items listed in the D-A EQPSPL file. This equipment can be assumed to have an expected life of one year or greater (thus depreciable). The user also can allow the BSP to compute repair costs on equipment items based on the technical data complement of each item in the D-A EQPSPL file. The steps used in repair cost computations are in Appendix C. This agendum can be omitted if no equipment is needed. Refer to Table 6-11.

Data Card 1 -- Variables CONTRL, IROW, NUMBER, METHOD, DBLPCT and OPCDWN are interpreted the same as for previous agenda except that CONTRL now refers to the file code for the D-A EQPSPL file. REPAIR allows the user to compute repair costs on the quipment; its use is self-explanatory. Variables YEQPRC, YEQLIF, YEQSLV and YEQRPR are optional overrides for the technical data complement found with each equipment item in the D-A EQPSPL file. These may be left blank if not needed. The life of the item is used in loan cost and investment capital deduction computation. The salvage value is used for several depreciation captial receipts values. If the user elects to have repair costs computed, special notes should be taken of the repair percentage found with the item of interest in the D-A EQPSPL file. The user should include a data card 1 for each type of equipment.

If the user already has an estimate of monthly repair costs for the equipment, these values can be entered as data in the VARC agendum. This

is described in further detail in "The VARC Agendum" on page 62.

The MACH Agendum

Once the user has "built" his facility by using the SYSD and BLDG agendas, it needs to be equipped with proper machinery. The MACH agendum enables the user to select the necessary types of power machinery and the quantity of each type, and to compute the costs of operating that machinery. The BSP defines machinery as all major implements (excluding pump drivers which are handled in subsequent agenda) with a power unit. This agendum uses the D-A PRICEV and D-A MACHIN files. The user should review the contents of these files before using this agendum. Machinery items contained in the D-A MACHIN file, and corresponding technical information, may be used. The user also can create a new type of machinery item and/or set of technical data by using the optional variables. The user has the option of allowing the BSP to compute repair, fuel and lubrication (oil, grease and filters) costs for each item in the machinery complement, based on monthly hours of use data he supplies and the technical data complement of each item in the D-A MACHIN file. The computational steps are described in Appendix C. As many data cards 1, 2 and 3 as necessary can be used. This agendum can be omitted if there is no need for machinery items.

If the user already has an estimate of monthly repair and/or fuel costs for machinery items, these values can be entered as data in the VARC agendum. Refer to the VARC agendum and Table 6.12 for further discussion.

Data Card 1 -- Variables CONTRL, IROW, NUMBER, METHOD, DBLPCT and OPCDWN are interpreted the same as for previous agenda except that CONTRL

refers to the file code for the D-A MACHIN file.

Variable ICODE is used to denote whether fuel and/or repair costs on the machinery will be computed or omitted. Refer to Table 5.15 for the various options. Fuel and/or repair costs can be computed two ways--apply a fuel and/or repair percentage to the initial cost of the item to get an annual cost and prorate this over the year, or use the BSP to compute fuel and/or repairs as a function of initial cost, age and hours of use. A further discussion of the computational algorithms employed is given in Appendix C.

Variables YMAPRC, YYRSWN, YSLPCT and YRPPCT allow the user to override the data in the D-A MACHIN file for each machinery item. The optional overrides can be used to alter any of the four items in the file data complement, or they may be left blank.

Data Card 2 -- This data card is included only if repairs are computed by the BSP on a functional basis or if fuel costs are to be computed. If ICODE is equal to 3, 4, 5 or 6, data card 2 must be included. To arrive at values for OMTPCT (1) through OMTPCT (12), estimate the number of hours of use by month for the machinery item corresponding to data card 1. Some months may be idle. Total these values and compute the percentage value for each month. The user can have an ICODE value of 3, 4, 5 or 6 but not wish to fill in data card 2. In this event, a blank card is included and all monthly values will default to .083 or 8.3 percent.

Data Card 3 -- If ICODE on data card 1 is set to 4, 5 or 6, the user is requesting that fuel costs be computed for the machinery item, and a per unit fuel price is needed. This is provided by entering the

the proper row from the D-A PRICEV file. Variables CONTROL and IROW are self-explanatory.

The PMEN Agendum

The PMEN agendum allows the user to arbitrarily select the pump and pump driver complement needed for the production facility. Water exchange requirements are determined by the user externally and the appropriate set of pumps and pump drivers are selected from the D-A POWERC and PUMPCM files. The user should be familiar with these files. Having selected the set of pumps and pump drivers, the user can allow the BSP to compute fuel and repair costs for water exchange purposes by using the PMEN agendum or can read in estimates for these costs by using the VARC agendum. The user must supply monthly average water exchange rates and monthly average days of operation to get these costs. This information either can be supplied by the user or by a growth model (refer to GROW agendum). If the user prefers for the BSP to select pumps and pump drivers, this agendum should be omitted. Refer to Table 6.13.

The user first should determine whether fuel and/or repair costs are to be computed by the BSP. If not, the values, if needed, must be computed externally by the user and read in by using the VARC agendum. If these costs are to be computed by the BSP, the user should decide exactly which costs are needed and refer to Appendix C for a detailed discussion of the computational steps employed.

Computation of fuel and repair costs for the pumping system requires data describing days per month that water is exchanged and data describing the average daily exchange rate per month. Fuel cost computation requires both sets of data; repair cost computation requires only the

days per month data. The BSP allows this information to be supplied directly by the user, or to be computed and supplied via a growth submodel. The method in which the data is supplied via a growth submodel is described in detail in Appendix B.

Fuel and/or repair costs for the pumping system can be accounted for by any one of three methods: (1) computed externally by the user and read in using the VARC agendum; (2) computed by the BSP with data supplied by the user (data card 1); or (3) computed by the BSP with data supplied by a growth submodel.

This agendum can be omitted if pumps are not needed to move large volumes of water (other than small utility pumps).

Data Card 1 -- This data card allows the user to determine if fuel and repair costs will be computed, and, if so, how they will be computed. Variable ICODE is used. The user should refer to Table 5.13 for a list of the options and their corresponding codes discussed previously. The use of the variable should be self-explanatory.

Variables IDYSXC (1) through IDYSXC (12) are used to input the total number of 24-hour periods that water will be moving through the system for exchange or directional flow purposes of course. This value must not exceed the total number of days in the corresponding month. If ICODE is set to 1, 3 or 5, these 12 values are omitted.

Variables PCTXCH (1) through PCTXCH (12) are used to enter the maximum average daily exchange rate percentage of water through the system on a monthly basis. This value is entered as a percentage. For example, if 10 percent of the total water volume is moved through the system per day as a maximum for the month of May, enter 10 percent (.10)

for PCTXCH (5). The term "exchange" applies to the movement of large quantities of water for exchange or directional flow properties. This value also is assumed to apply to the system as a whole (e.g., if the system has 30 ponds, each pond's exchange rate is the same). The term "maximum average daily" means the average exchange rates percentage per day of each month, or the maximum of these values per month.

The data supplied by variables IDYSXC(i) and PCTXCH(i), where i = 1 - 12, also can be supplied via a growth model (see discussion on GROW agendum). The user should become quite familiar with the use of growth submodels if this option is used.

If the user prefers to compute fuel and repair costs for pumps externally, rather than use the BSP, ICODE should be set to "1" and the externally computed data entered in the VARC agendum.

Data Card 2 -- Variables CONTROL, IROW, LIFE, SALVAG, METHOD, PBLPCT and DPCDWN are interpreted as in previous discussions. CONTRL, however, contains the file code for the D-A PUMPCM file code "8" in column 2. LIFE should contain the economic life of the pump and pump driver, which are assumed to be the same.

Variable NBRPMP denotes the number of pumps. The assumption is that each pump has a corresponding pump driver, and that each pump is the same size (size and number of pump drivers is done with the next data card).

Variable YPRICP allows the user to override the unit price for the pump in the D-A PUMPCM file. Variable ITTLVO allows the user to provide the maximum total water volume at any given point in time of the production system. This value is needed to compute fuel costs. If the

subagendum GIVN is used, the user must enter a value for total system water volume here. This variable is omitted when the CALC subagendum is used since the system design subroutine will compute the total water volume for the corresponding system design. The value of total water volume will be "passed" from the system design subroutine to the appropriate subroutines associated with the PMPC agendum.

Data Card 3 -- This data card enables the user to select the number and size of pump drivers (engines) to use with the previously selected pumps. Variables CONTRL and IROW are self-explanatory except that they now apply to the D-A POWERC file. There must be a pump driver for each pump, so NBRENG must be the same value as NBRPMP on data card 2. YPRICE is the optional per unit price for the pump drivers selected from the D-A POWERC file.

Data Cards 4, 5 and 6 -- Computational methods for fuel cost estimations require a set of parameters whose values can vary depending on pump and pump driver design and fuel type. These three data cards are used to input this technical information necessary to compute fuel costs for the pumping system. If the user does not want the BSP to compute fuel costs (i.e., ICODE equal 1 or 2 from data card 1), these cards should be omitted. Data cards 4, 5 and 6 request information on pump efficiency, engine efficiency and pump fuel BTU's per gallon of fuel type, respectively. This information is in the D-A PARMTR file. The user should select the appropriate row number for each piece of information. This data is standard technical information that must be entered upon creation of the D-A PARMTR file. If the user prefers to use more appropriate values for a specific system, optional values should be

used and the file row number left blank. Variable TOTHED (on data card 4) is used to input the total dynamic pumping head (maximum high water level minus minimum low water level) of the system.

Data Card 7 -- This card is used to input the per unit fuel price. It is used only if the user prefers to have the BSP compute the fuel costs for pumping (i.e., ICODE on data card 1 equal 1 or 2). The CONTRL, IROW and optional variable are used exactly as in previous examples, except that reference is made to the D-A PRICEV file.

The PMPC Agendum

The PMPC agendum is the counterpart to the PMEN agendum. This agendum allows the BSP to select the required number and size of pumps and pump drivers for the system. These selections are made based on the water handling requirements (water volume and exchange rates) of the system. A restriction on this agendum is that, if used, it must be in conjunction with the CALC subagendum. The CALC subagendum supplies a value for total water volume at a given point in time for the facility and this volume value is used to select the pumps and pump drivers. As with the PMEN agendum, the user may allow the simulator to compute the operating costs of the pumping system. The same logic and data requirements exist for computing these costs. This agendum accesses the D-A PUMPCM and POWERC files. If the features of this agendum are not needed, it should be omitted from the control-stream. Refer to Table 6.14.

Data Card 1 -- The variables on this card are interpreted exactly as for those on data card 1 of the PMEN agendum.

Data Card 2 -- The BSP selects the proper pump(s) and pump driver(s) by computing the water handling requirements of the system, and, by

referring to the D-A POWERC and PUMPCM files, sorting through the pumps and engines entered in the files until an appropriate match is found. The pumps and engines are stored in ascending order of gallons per minute capacity and purchase horsepower, respectively. Both pump and engines are stored by "type," however. The user should refer to Tables 5.04 and 5.03 for the code for each type, and to the D-A POWERC and PUMPCM files for the types available. Variable ENCODE is used to input the engine type code. PMCODE is used to input the pump type code.

Since the pump(s) and pump driver(s) are selected automatically in this agendum, there must be some mechanism to provide the size of water handling task for a specific system. IXCHNG is a percentage value expressing the maximum percentage of the total water volume of the system that will be exchanged during any 24-hour period. Multiplying this value by the total water volume supplied by the CALC subagendum gives the size of the water handling task for the system. The variable TOTHED is defined exactly as found on data card 4 in the PMEN agendum.

Variables LIFE, SALVAG, METHOD, DBLPCT and OPCDWN are interpreted the same as in previous agenda.

Data Card 3 -- This data card is the same as data card 4 in the PMEN agendum except that variable TOTHED found on data card 4 is not found here. Leave IROW blank if the optional value YPEFF is used.

Data Cards 4 and 5 -- Data card 4 allows the user to select the drive efficiency rating from the D-A PARMTR file. The user should refer to Table 5.05 for the types and corresponding efficiency coefficients. Data card 5 allows the user to select an appropriate derate factor. The BSP will select an engine based on the purchase horsepower needs of the

system. This value is compute by applying a derate conversion factor to a brake-horsepower value computed by the BSP. This conversion factor varies with the type of engine. The engine type and corresponding derate value are given in Table 5.06. The user should select the appropriate D-A PARMTR file row number. Optional values exist for both data cards 4 and 5 if appropriate values are not found in the D-A PARMTR file. If the optional values are used, leave the corresponding IROW variables blank.

Data Cards 6, 7 and 8 -- These data cards are interpreted the same as data cards 5, 6 and 7 of the PMEN agendum.

Production Agenda Group

The PROD Agendum

The PROD agendum is used when production for each month of a typical year in the planning horizon is computed externally and simply read in. The user may use prices for yield for the appropriate species as found in the D-A HARVST file. If no prices are found for the particular species, if prices are out of date or if the species is not found in the HARVST file, the user can enter his own price and descriptive information. If the use of a growth model is requested (GROW agendum), this agendum can be omitted or used in addition to the growth model. The user can use as many sets of data cards 1, 2 and 3 as needed to accommodate production of as many species as sizes per species. Refer to Table 6.15.

Data Card 1 -- This data card is used to specify the appropriate set of 12 monthly prices for the species and size of concern. These prices are found in the D-A HARVST file. Variables CONTRL and IROW are used for this purpose. CONTRL should contain the file code for the D-A HARVST file.

Variable YCNVFC is used to convert the set of prices in the file to the proper units. For example, if heads-off prices are needed, but the D-A HARVST file contains only heads-on prices, a conversion factor can be entered as YCNVFC that will be multiplied by each price. Otherwise, leave blank because default is 1.0.

Variable IICODE is used to flag the BSP that optional prices will be used. If, for example, the user refers to the D-A HARVST file and finds the correct species and size but wrong prices, or the correct species but wrong size, the optional prices can be entered in on data card 3. If this is the case, IICODE should be set to 1.0 and IROW left blank.

Data Card 2 -- This data card allows the user to enter monthly production quantities for the species and size corresponding to the per unit price requested on data card 1. The units between the production data and the per unit price must coincide. Some months can be left blank if no production occurs. This data must be computed and/or compiled external to the BSP.

Data Card 3 -- This data card allows the user to enter optional monthly per unit prices for the species and size of concern. The user can use this option to "create" a new size for a given species or a new species or to modify the description or prices for a species or size found in the D-A HARVST file. Data card 3 must be included if IICODE on data card 1 is set to 1.

The GROW Agendum

The GROW agendum allows the user to select a growth model, or provide one, to compute yield and some operating costs. The user should refer

to Table 5.12 for a list of the available growth model (which should be specific to a given BSP installation) and Appendix B for the capabilities and limitations of each. If a growth model that produces the desired information is not found in those provided by the simulator, the user should (1) refer to Appendix B to add a new growth model, or (2) use the PROD agendum to read in production. Appendix B should be read carefully before the GROW agendum is used. This agendum should be omitted if a growth model is not needed. Refer to Table 6.16.

The user's first task in completing this agendum is to refer to Appendix B and determine if a growth model which performs the needed computation is found in the simulator. The documentation provided should enable users to make this determination. A unique code is given with each model. This subroutine library growth model code should be given on data card 1. If the user does not find a model that produces the desired output, a new subroutine can be inserted into the library of models. Again, users should refer to Appendix B to obtain the necessary procedures for this option. A maximum of 20 models can be added. If the library of models is full, users can replace an existing model with a new one.

One very subtle function of the growth model must be noted here. Discussions of the PMEN and PMPC agenda noted that if the variable ICODE on data code 1 of either agenda were set to 5, then the remaining data on that card was left blank, to be supplied by a growth model (refer to Table 5.13). If this option is used, the growth model must be able to generate the data for IDYSXC(I) and PCTXCH(I), where I = 1 through 12. This data passes out of the growth model to compute fuel and repair costs

for the pumping system. The growth model does not have to perform this function--it is an option. If ICODE is set to 5, however, this option must be used. Refer to Appendix B for a discussion on modifying a growth model to allow for this option. Also note that there are no variables in the GROW agendum that signal the use of this option.

The growth model also can compute other variable costs that can be matched to per unit prices from the D-A PRICEV file. In addition, information computed by the CALC subagendum can be passed to the growth model for use. These functions are discussed in detail with the corresponding data cards.

Data Card 1 -- The user should refer to the listing of available growth models, select the appropriate model and enter the unique growth model LIBRARY code as the variable model.

Once the user selects an appropriate growth model, the data input necessary to run the submodel should be examined. If the model requires one of the "Standard Data" items produced by a system design subroutine discussed in the introduction to the CALC subagendum (Table 5.11), the user may transfer the data item by placing the corresponding item code's value in the variable VALCOD. This option can be used only if the CALC subagendum is used. VALCOD should be left blank if this option is not needed.

Variable PRCDCE enables the user to select the species code of the organism being cultured. The user should refer to a current listing of the D-A HARVST file for the species code. Each code is unique to a certain species. This code allows the BSP to search through the D-A HARVST file which is sorted by species. Once the species is found, the

prices for the appropriate size are retrieved. A listing of sample species codes are in Table 5.14.

The growth submodels do have the option of computing some operating expenses (i.e., feed, fuel, fertilizer, etc.) as production is computed. If this option is needed, VCFLAG should be assigned a "1"; otherwise, leave VCFLAG blank. If this option is desired, the growth model must have certain capabilities of which the user must be keenly aware. These are discussed in Appendix B as well as, to a lesser extent, in the following discussion on data card 3.

Data Card 2 -- The growth submodel selected by the user is unique from any other found in the growth model library. It has unique data requirements in order to run. The data requirements should be documented. The information and data necessary to run the selected growth submodel should be entered on data card 2 (as many as necessary). This information can occupy all 80 columns of each data card if necessary. The data can be integer and/or real. The user should refer closely to the documentation of the particular model employed so that the proper information is placed in the proper order in the set of data card 2's.

Data Card 3 -- If the user specifies a "1" for the variable VCFLAG, up to 25 data card 3's should follow. These cards refer to the unit price row number (IROW) from the D-A PRICEV file that corresponds to operating cost items that are generated during the production process by the growth model for a typical year. The growth model documentation in Appendix B indicates what types of operating cost units are generated by the specific growth model employed. These values are stored by month in an array in a specific order. Therefore, the D-A PRICEV file row numbers

should appear in the corresponding order to allow matching of quantities to the corresponding unit prices. A further discussion of this procedure is in Appendix B. There are 16 categories of types of operating costs established by the BSP. Each category has a unique code assigned to it (Table 5.08). The user should enter the corresponding code on each data card 3 in variable ICODE. If a desired category is not represented by categories 1 through 11, the user should use the optional categories 12 through 16. If VCFLAG on data card 1 is left blank, data card 3 should be omitted.

Cost Agenda Group

The VARC Agendum

The only operating costs discussed thus far have been pump, pump driver, machinery equipment repairs and fuel costs. Other than variable costs computed within growth models and certain taxes (discussed in the FNCL agendum), the costs relating to the pumping system and machinery are the only operating costs actually computed by the model. Any other operating costs must be computed externally by the user and entered on data cards 1 and 2. The VARC agendum allows the user to enter his externally computed operating costs (in terms of units) as input data and also gives the user the option of changing a per unit price in the D-A PRICEV file at the time of the current run. The user also can create a new operating input unit price not found in the D-A PRICEV file for the current run by making use of such optional data as that described in the preceding agenda. The VARC agendum allows the user to enter his own quantity values from total variable input units used per month for any number of types of variable input items. This agendum can be omitted if

it is not needed. Refer to Table 6.17.

Data Cards 1 and 2 -- The first item on data card 1 is a four-letter "Variable Input Type Keyword" that is uniquely associated with a type of variable input. These keywords are directly analogous to the "Operating Cost Type" codes given in the PROD agendum and found in Table 5.08. The types of variable input costs and their respective keywords are given in Table 5.07. The user must decide in which category each type of input item belongs and place the corresponding keywords in the variable CONTRL on data card 1. The user will supply a set of cards containing data cards 1 and 2 for each input type. If the user needs to input more than one type of fuel, for example, two types (i.e., "FUEL" - diesel fuel and L.P. gas), then two card sets for "FUEL" need to be entered; these card sets must be adjacent. Only the first set of cards for "FUEL" type input will have the keyword "FUEL" on data card 1. Columns 1-4 on data card 1 in the next "FUEL" set(s) will be blank. The next type of cost item will have its respective keyword.

The user should refer to the D-A PRICEV file to determine which item's unit prices can be selected from the file. The file code ("7" in column 2) and row number of the selected price should be entered on data card 2. If an item is needed but cannot be found in the D-A PRICEV file or if a price needs to be changed temporarily, the D-A PRICEV file code and row number and data card 2 should be left blank and the optional variable YPRCST submitted and IROW left blank. If no price changing is necessary, YPRCST should be left blank.

The remainder of the information found on data cards 1 and 2 is the total units of each item used per month in a typical year. Months

January through June are found on data card 1 (variable MTHQTY (1) through MTHQTY (6)), and months July through December are found on data card 2 (variables MTHQTY (7) through MTHQTY (12)). A maximum of 999,999 units per month is established. If more is needed, enter a new "SET" of data cards (1 and 2) for the same item, omitting the keyword.

A set of cards containing data cards 1 and 2 should be entered for every variable unit item needed for production. The user should submit as many "SETS" of data cards as necessary.

The OVHD Agendum

The OVHD agendum enables the user to account for periodic overhead costs. It is assumed that these costs occur at least once each year in the firm's planning horizon. The user should refer to the D-A OVERHD file for the costs and respective descriptions relative to overhead expenses. Optional data may be used if the items found in the D-A OVERHD file are insufficient. This agendum can be omitted if no overhead costs are required. Refer to Table 6.18.

Data Card 1 -- The user should refer to the D-A OVERHD file to find the appropriate cost item. If the item is found in the file, the user should place the D-A OVERHD file code and item row number in variables CONTRL and IROW, respectively. If the desired item is not found in the file or is outdated, the user can leave variable IROW blank and use the optional variable MYVAL.

The cost items found in the D-A OVERHD file are the total costs that occur in a particular month. The variable MONTH(i), where i is 1 through 12, is used for this purpose. The user finds an appropriate cost in the D-A OVERHD file and designates in which month(s) the cost occurs. This

is done by placing a "1" for every month that the cost will occur. For example, an annual license may be purchased once each year in January, therefore a "1" should appear only in column 10. Insurance premiums, however, may be paid monthly so a "1" would be entered for each month. Quarterly insurance payments could be entered in January, April, July and October. The user should submit a set of data cards for every type of overhead cost item needed.

The SLRY Agendum

This agendum allows the user to specify the number of salaried individuals at given salary levels. The logic behind this agendum is the same as for the OVHD agendum with two exceptions--(1) when entering a data card for each salary level the user must specify the number of individuals at this salary level; and (2) this agendum must be used even if data card 1 is left blank. The user must refer to the D-A OVERHD file. Refer to Table 6-19.

Data Card 1 -- Variables CONTRL, IROW, MONTH(i) where i is 1 through 12 and MYVAL are used exactly the same as for the OVHD agendum. Variable MANGRS is used to designate the number of individuals at the salary level corresponding to each data card.

Output Agenda Group

The BUD1 Agendum

The BUD1 agendum is used to designate whether or not a detailed annual budget is desired as output. The budget can be on a per technical unit (acre, hectare, etc.) basis or on a whole-farm basis. The budget will be for the object year in the planning horizon given in the FNCL agendum. The user also can create some subheadings in the output. The

detailed budget has the greatest resolution in cost itemization when compared with the other two budget options (aggregate budget, BUD2 agendum, and general budget, BUD3 agendum). This agendum can be omitted if a detailed annual budget is not desired as part of the output. Refer to Table 6.20.

Data Card 1 -- Variable IOPTN designates whether or not the budget is on a whole-farm basis or a per technical unit basis. Each subagenda of the SYSD agendum enabled the user to determine the size of the facility and to describe the technical unit. This value and description will be displayed in all output headings. The annual budget may be expressed on a per unit of facility size basis (per acre, per hectare, etc.). If the user wishes to have output on a whole-farm basis, IOPTN should be given a value of "1." If the user prefers output on a per technical unit basis, IOPTN should be given a value of "2."

The "VARIABLE INPUT TYPE" descriptions in Table 5.07 are also displayed as variable cost subheadings in the annual budget if the corresponding variable input type is used. The user can create these subheadings that are expected in the budget for SPC1 through SPC5 by assigning the variable input's respective keyword code (found in Table 5.07) to the variable KYCODE. The optional heading should be entered as the variable MYTITL. If the operating cost codes 12 through 16 were used in the VARC agendum, there is no corresponding heading in Table 5.07. Therefore, the user must create the headings on this data card. If more subheadings need to be changed, the user should include as many data card 1's as necessary. If no heading changes are needed, however, KYCODE and MYTITL should be omitted. If the user uses more than one data card 1,

then the variable IOPTN must be left blank on all but the initial data card.

The BUD2 Agendum

The BUD2 agendum allows the user to designate whether or not the aggregate annual budget is to be included in the output. This agendum should be omitted if this is not desired.

Variable IODTN is used as in the BUD1 agendum. The subheading options are not available with this agendum. Refer to Table 6.21.

The BUD3 Agendum

The BUD3 agendum is used to designate whether or not a general annual budget is desired as output. The budget can be on a per technical unit or whole-farm basis. This agendum can be omitted if not needed.

The use of this agendum is identical to the BUD2 agendum. The subheading options are not available with this agendum. Refer to Table 6.22.

AGENDA INPUT TABLES

The following tables are to guide the user in entering specific data for each agendum. Table 5 is a summary of codes needed to develop a control stream. Table 6 details the control-stream variables and the format by which they are entered into the computer.

The user should be aware of certain things before attempting to fill in the data for the necessary agendum.

- The format given with each variable in the agenda specifies how the data is to be entered. The user needs to be familiar with FORTRAN format in order to enter the data in the specified columns of the data card properly.
- Whenever the agenda requires that data be entered on a percentage basis with F4.2 format, the user should enter, for example, 0.12 for 12 percent.
- The variable CONTRL found in many agenda is where the user must enter the D-A file code for the D-A file accessed for data. These file codes are in Table 5.09. This code must be entered in columns 1 and 2 and right justified.
- As noted earlier, each agendum requires that the user include a KEYWORD on the first card. The keyword associated with each agendum is given in the asterisked heading for each agendum's table.

Table 5 - Summary of Codes

5.01 Depreciation Methods Code

Code	Meaning
1	Straight line
2	Sum of the years digits
3	Double declining balance
4	No depreciation

5.02. Loan Payment Schedule

Code	Meaning
1	Monthly
2	Quarterly
3	Annually

5.03. Pump Type Code

Code	Pump Type
1	Extended Shaft
2	Hydraflo-portable
3	Deep-well Turbine

5.04. Pump Engine Driver Type Codes

Code	Pump Engine Type
1	Diesel
2	LP gas
3	Gasoline
4	Electric

5.05. Driver Type Coefficients

Value	Driver Type
1.00	Direct Drive
0.97	Right-angle Drive
0.95	V-Belt Drive
0.80	Flat-Belt Drive

5.06. Engine Type Coefficients

Derate value	Engine Type
1.0	Internal combustion
0.8	Electric

5.07. Variable Input Type Keywords

Keyword	Variable Input Type Description
STCK	Stocking Seed and/or Fry
RPRE	Repairs and Maintenance on Equipment
RPRM	Repairs and Maintenance on Machinery
LUBR	Oil, Filters, and Lubricants
FUEL	Fuel
FEED	Feed and Ration Supplements
FERT	Fertilizer and Chemicals
LABR	Labor and Wages
UTIL	Utilities
SUPP	Supplies
MISC	Miscellaneous
SPC1	Optional #1
SPC2	Optional #2
SPC3	Optional #3
SPC4	Optional #4
SPC5	Optional #5

5.08. Operating Cost Type Codes

Code	Operating Cost Type	Maximum Size of File
1	Stocking seed and/or fry	10
2	Repairs and Maintenance on Equipment	40
3	Repairs and Maintenance on Machinery	20
4	Oil, Filters, and Lubricants	20
5	Fuel	20
6	Feed and Ration Supplements	20
7	Fertilizer and Chemicals	10
8	Labor and Wages	20
9	Utilities	10
10	Supplies	40
11	Miscellaneous	10
12	Optional #1	10
13	Optional #2	10
14	Optional #3	10
15	Optional #4	10
16	Optional #5	10

5.09. Direct Access Data File Codes

File Code	File Name
1	EQPSPL
2	HARVST
3	MACHIN
4	OVERHD
5	PARMTR
6	POWERC
7	PRICEV
8	PUMPCM
9	SYSDES
10	TECHUN

5.10. Subroutine Library System Design Code

File Code	Meaning
1	Ekstrom/Adams Pond Model the equates cut and fill, requires 6 pond minimum and adds two adjacent ponds to vary size (sample).

2	Non available- User can add subroutine as needed. Refer to Appendix A.

5.11. Facility Size Code (Vector A)

Item Code	Item Description
1	Total Surface Area of System
2	Total Surface Area per Production unit
3	Total Water Surface Area
4	Total Water Surface Area per Production unit
5	Total Water Volume
6	Total Water Volume per Production unit
7	Water Depth
8	Number of Production units

5.12. Subroutine Library Growth Model Code

File Code	File Item
1	Growth Model GMDL01 - A Dummy Sample Model
2	Hanson Shrimp Simulation Model
3	Non Available-User can add sub-routines as needed. Refer to Appendix B.

5.13. Fuel and/or Repair Computation for pumps.

Code	Meaning
1	Fuel and repair costs are not to be computed by this agendum. Omit information under IDYSXC(i) and PCTXCH(i), i= 1-12, on data card 1.
2	Only repair costs computed. Omit information under PCTXCH(i), i=1-12 on data card 1 and omit data cards 4,5,6,and 7.

3	Only fuel costs computed. Omit information under IDYSXC(i), i=1-12 on data card 1.
4	Fuel and repair costs computed by this agendum. Include IDYSXC(i) and PCTXCH(i), i=1-12 on data card 1.
5	Fuel and repair costs computed by this agendum with information derived by growth submodel. Omit information under IDYSXC(i) and PCTXCH(i), i=1-12, on data card 1.

5.14. Product Description Code

Code	Product Description (Example)
1	Whole Penaeid shrimp (fresh)
2	Hard Crabs (live)
3	Soft Crabs
4	Penaeid nauplii
5	Mudminnows (Fundulus)
6	Alternate Product Description code

(Refer to D-A HARVST file and COBOL Volume 1 documentation of D-A HARVST file).

5.15. Fuel and/or Repair Computation Code for Machinery

Code	Description
1	Do not calculate repairs or fuel.
2	Calculate only repairs on annual percentage basis and prorate evenly over the months.
3	Calculate only repairs by computation method of BSP.
4	Calculate only fuel.
5	Calculate repairs and fuel on an annual percentage basis and prorate evenly over the months.
6	Calculate repairs and fuel by computation method of BSP.

Table 6 - Control Stream Variables and Format

****
* *
* 6.1. Agendum: DSCR (col. 1-4, 1st card) *
* *
****

Variable Name	Description	Format	Column
Data Card(s) 1-50:			
SDESCR(20)	System description. May be up to 50 cards in lengtn. Should concisely describe the system of interest.	20A4	1-80
END* (col. 1-4, last card).			

****
* *
* 6.2. Agendum: TITL (col. 1-4, 1st card) *
* *
****

Data Card 1:			
TITLN(20)	Concise system title to be used in output headings. Must use only 1 card.	20A4	1-80
END* (col. 1-4, last card).			

****
* *
* 6.3. Agendum: FTNT (col. 1-4, 1st card) *
* *
****

Data Card 1:			
FTNOTE(60)	Footnote concerning some aspect of system which will be found at the bottom of output. May use up to 3 cards.	20A4	1-80
END* (col. 1-4, last card).			

```
*********************************************
*                                           *
* 6.4.  Agendum: PRNT (col. 1-4, 1st card)  *
*                                           *
*********************************************
```

Variable Name	Description	Format	Column
PRNT1	Initial capital investment description output code	I1	5
PRNT2	Variable input by month (units) output code	I1	7
PRNT3	Variable input by month (units/Tech.unit) output code	I1	9
PRNT4	Variable input by month (Dollars) output code	I1	11
PRNT5	Variable input by month (Dollars/Tech.unit) output code	I1	13
PRNT6	Monthly cash flow statement output code (NPV)	I1	15
PRNT7	Monthly cost summary output code	I1	17
PRNT8	Annual cash flow statement output code	I1	19
PRNT9	Balance sheet output code	I1	21

END* (col. 1-4, last card)

1. Zero codes suppress the printing of a specified output and 1 (one) codes allows the printing.

2. If the agendum is not included, all output are printed.

3. Optional printing for budgets is controlled separately using Agenda BUD1, BUD2, and BUD3.

****
*
* 6.5. Agendum: FNCL (col. 1-4, 1st card) *
*
****

Data Card 1: Leave blank any "optional" values not used. Enter 0.12 for 12% in F4.2 format).

Variable Name	Description	Format	Column
PLNHRZ	Planning horizon length of firm. Must be < 30 years.	I2	5- 6
OBJTYR	Object year of analysis. Must be < or = to the planning horizon length.	I2	8- 9
BEGIN	Beginning cash balance in excess of downpayment on capital. Program will add this balance to the beginning downpayment to get owner's initial investment.	I6	11-16
MINBAL	Minimum allowable annual cash balance.	I6	18-23
ISTACD	State tax code. Enter a "1" if state taxes are to be computed. Otherwise leave column 25 blank.	I1	25

TAXCOD	Federal income tax code. Leave blank if you do not want taxes calculated; enter "1" for taxes calculated on a sole-proprietorship; or "2" for corporate taxes.	I1	27
MTHDOP	Enter code for optional depreciation method. Default is straight line. See Table 5.01.	I1	29
PCDOWN	Enter the optional percent down payment. Default is set at 0.00 (0%).	F4.2	31-34
IVESTX	Enter a "1" to include investment tax credit on all capital investments, otherwise leave. This Option not available yet!!	I1	36
IOPFP2	Enter code for optional loan payment schedule. Default is monthly. See Table 5.02.	I1	38
XINTS	Optional short-term interest rate. Overrides D-A PARMTR file row 24.	F4.2	40-43
XINTM	Optional mid-term interest rate. Overrides D-A PARMTR file row 25.	F4.2	45-48
XINTL	Optional long-term interest rate. Overrides D-A PARMTR file row 26.	F4.2	50-53
STAPCT	Optional state tax percentage. Overrides D-A PARMTR file row 48.	F4.2	55-58
RATE7	Optional net present value discount rate. Overrides D-A PARMTR file row 45.	F4.2	60-63

INSUR1	Optional building insurance rate. Overrides D-A PARMTR file row 27.	F4.2	65-68

Data Card 2: If none of these options are needed, omit this card. Enter 0.12 for 12% in F6.2 format.

Variable Name	Description	Format	Column
INSUR2	Optional machinery and equipment insurance rate. Overrides D-A PARMTR file row 28.	F6.2	5-10
RATE3	Optional property tax rate. Overrides D-A PARMTR file row 37.	F6.2	12-17
RATE4	Optional property tax divisor. Overrides D-A PARMTR file row 38.	F6.2	19-24
RATE5	Optional local mill rate. Overrides D-A PARMTR file row 39.	F6.2	26-31
INSUR3	Optional workman's compensation rate. Overrides D-A PARMTR file row 29.	F6.2	33-38
INSUR4	Optional workman's compensation divisor. Overrides D-A PARMTR file row 30.	F6.2	40-45
IENTRT	Optional return to entrepreneurship. Overrides D-A PARMTR file row 47.	I6	47-52

END* (col. 1-4, last card).

****
*
* 6.6. Agendum: TXCR (col. 1-4, 1st card) *
*
****

Variable Name	Description	Format	Column

Data Cards 1-22: All 22 data cards must be included.

II	Row number for tax data in the D-A TAXTBL file	I6	6-11
TAX(II,1)	Maximum income level	I6	13-18
TAX(II,2)	Base Tax	I6	20-25
TAX(II,3)	Tax percentage rate	I6	27-32

END* (col. 1-4, last card).

****
* *
* 6.7. Agendum: TXMD (col. 1-4, 1st card) *
* *
****

Variable Name	Description	Format	Column

Data Cards 1-22: As few as one or as many as 22 data cards may be used.

II	Row number to update tax data in D-A TAXTBL file	I6	6-11
TAX(II,1)	Maximum income level	I6	13-18
TAX(II,2)	Base Tax	I6	20-25
TAX(II,3)	Tax percentage	I6	27-32

END* (col. 1-4, last card).

****
* *
* 6.8. Agendum: TXWR (col. 1-4, 1st card) *
* *
****

Comment: No data cards required. This agenda simply writes out the D-A TAXTBL file. (For discussion see Section III on page 15).

END* (col. 1-4, last card).

****
* *
* 6.9. Agendum: SYSD (col. 1-4, 1st card) *
* *
****

Comment: This agendum includes items such as land and pond construction costs. If pond construction costs are to be read in instead of being calculated by the program, the "GIVN" subagendum allows for outside calculation of information for land and pond construction costs. Alternatively, the "CALC" subadgendum calculates land and pond construction costs internally and the output is expressed on a specified per unit basis.

****
* A. Subagendum: GIVN (col. 1-4, 2ND card)*
****

Data Card 1:

Variable Name	Description	Format	Column
TEDSCR	Technical unit description (ie. acres, acre-feet, number of tanks, hectares, etc.)	8(A4)	5-36
SIZE	Facility size, total area of unit in technical units described above.	F13.2	38-50

Data Card 2: Data Card 2 must be duplicated for each different type of item used in the construction of the production facility. Leave blank any optional values not used. Enter 0.12 for 12% in F4.2 format.

Variable Name	Description	Format	Column
CONTRL	D-A PRICEV file code " 7 ". The '7' is found in column 2.	A4	1- 4
IROW	D-A PRICEV file row number for input item.	I4	5- 8
NUMBER	Quantity of item used.	I6	10-15
LIFE	Life of item in years. Must be equal to planning horizon in FNCL agendum.	I2	17-18
YURCST	Optional per unit price of the item. If used, IROW should be left blank.	F7.2	20-26
SALVAG	Optional salvage value Percentage of item price. Defaults to 0.00.	F4.2	28-31
DBLPCT	Optional accelerated depeciation percentage code. Default set at 2.	I2	33-34
METHOD	Optional depreciation method. Default is straight line. Unless altered in FNCL agendum, in which case leave blank. See Table 5.01.	I1	36
OPCDWN	Optional downpayment percentage. Default set at 0.00 (0%) unless changed in FNCL agendum, in which case leave blank.	F4.2	38-41

END* (col. 1-4, last card).

****
* B. Subagendum: CALC (col. 1-4, 2ND card)*
****

Comment: Refer to Appendix A in text. This subagendum for use in conjunction only with system design subroutine (Table 5.10)

Data Card 1:

Variable Name	Description	Format	Column
IROWD	System design subroutine library code. See Table 5.10.	I2	5- 6
RESULT	Facility size code. See Table 5.11.	I2	8- 9
TEDSCR	Technical unit description	8A4	11-30

Data Card 2: This card or set of cards can be read in an unlimited number of times to read in the data necessary for satisfying the data requirements of the selected system design subroutine. This example uses on two data cards (2a and 2b). Other system design subroutines may contain only one, two, or many. Refer to input data on data cards 2a and 2b. Required data may be different depending on system design subroutine utilized. Refer to Appendix A in text.

Sample System Design Subroutine Input Data (Code Number 1 from Table 5.12)

Price information "must" be obtained in "CALC" data card 3 for the following:
- unit price of land
- price per cubic yard of earth
- price per cubic yard of gravel

The three price data cards "must" appear in the same order as listed above.

Data Card 2a: The information contained on this card is specific to a given system design subroutine and may vary depending upon the system design subroutine employed.

Variable Name(1)	Description	Format	Column
1.1	Pond size (surface acres at max. fill,excluding freeboard).	F6.2	5-10

1.2	Pond number (must be even numbered and a minimum of 6).	I3	12-14
1.3	Inverse slope of outside levees.(2)	F6.2	16-21
1.4	Inverse slope of inside levees.(2)	F6.2	23-28
1.5	Maximum water depth of pond (feet).	F6.2	30-35
1.6	Minimum maximum depth of pond including freeboard (feet).	F6.2	37-42
1.7	Slope of pond bottom.(3)	F6.2	44-49
1.8	Pond length to width ratio (L/W in feet).	F6.2	51-56
1.9	Crown width of outside levees (feet).	F6.2	58-63
1.10	Crown width of inside levees (feet).	F6.2	65-70

(1) Specific variable names are arbritary.
(2) If levee actually slopes downward at 1 foot per 3 feet horizontally, enter 3.00.
(3) Enter decimal value which expresses drop in pond bottom (feet) per foot of pond length.

Data Card 2b: Information contained on this data card is specific to a given system design subroutine and may vary depending upon the system design subroutine employed.

Variable Name(1)	Description	Format	Column
2.1	Drainage ditch side slope.(2)	F7.2	5-11
2.2	Berm width (feet).	F7.2	13-19
2.3	Width of drainage ditch flat bottom (feet).	F7.2	21-27

2.4	Depth of drainage ditch below drainage exit (feet).	F7.2	29-35
2.5	Distance of drainage ditch extension past the ponds (feet).	F7.2	37-43
2.6	Freeboard (feet).(3)	F7.2	45-51
2.7	Compaction allowance (ca) (0 < ca <= 1.0; allows for soil settling).	F7.2	53-59
2.8	Drainpipe slope.(2)	F7.2	61-67
2.9	Drainpipe diameter (feet).	F7.2	69-75

(1) Specific variable names are arbitrary.
(2) Compute slope the same as for pond bottom slope in card 2A.
(3) Freeboard is the distance from water surface to levee top.

Data Card 3: This card must be duplicated to obtain unit prices for all input items that are generated by the system design subroutine. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PRICEV file code " 7 ". The "7" is found in column 2.	A4	1- 4
IROW	D-A PRICEV file row number for input item.	I4	5- 8
LIFE	Life of item in years.	I2	10-11
YCOST	Optional per unit price of the item. If used IROW should be left blank.	F7.2	13-19
SALVAG	Optional salvage value of item. Overrides default value of 0.00 in program.	F4.2	21-24

METHOD	Optional depreciation method. Default is straight line. ...unless changed in FNCL agendum, in which case leave blank. See Table 5.01.	I2	26-27
DBLPCT	Optional accelerated depeciation percentage code. Default set at 2.	I1	29
OPCDWN	Optional downpayment percentage. Default set at 0.00 (0%) unless changed in FNCL agendum, in which case leave blank.	F4.2	31-34

END* (col. 1-4, last card).

****
* *
* 6.10 Agendum: BLDG (col. 1-4, 1st card) *
* *
****

Data Card 1: The user may include as many Data Card 1's as necessary. Leave blank any optional value not used.

Variable Name	Description	Format	Column
CONTRL	D-A PRICEV file code " 7 "	A4	1- 4
IROW	D-A PRICEV file row number for input item.	I4	5- 8
NUMBER	Quantity of item used.	I6	10-15
LIFE	Life of item in years.	I2	17-18
YURCST	Optional per unit price of the item. If YURCST is used, leave IROW blank.	F7.2	20-26
SALVAG	Optional salvage value Default value is 0.00.	F4.2	28-31

METHOD	Optional depreciation method. Default is straight line. ...unless changed in FNCL agendum, in which case, leave blank. See Table 5.01.	I2	33-34
DBLPCT	Optional accelerated depreciation percentage code. Default set at 2.	I1	36
OPCDWN	Optional downpayment percentage. Default set at 0.00 (0%) unless changed in FNCL agendum, in which case leave blank.	F4.2	38-41

END* (col. 1-4, last card).

****
*
*6.11. Agendum: EQMT (col. 1-4, 1st card) *
*
****

Data Card 1: The user may include as many Data Card 1's as necessary. Leave blank any optional value not used.

Variable Name	Description	Format	Column
CONTRL	D-A EQPSPL file code " 1 ".	A4	1- 4
IROW	D-A EQPSPL file row number for input item.	I4	5- 8
NUMBER	Quantity of item used.	I6	10-15
REPAIR	Repair code. To compute repair enter "1". A "0" implies that no repairs are to be computed.	I1	17
YEQPRC	Optional unit price. Overrides unit price in D-A EQPSPL file.	I6	19-24

YEQLIF	Optional life of item in equipment file. Overrides unit life in D-A EQPSPL file.	I2	26-27
YEQSLV	Optional salvage value of item in equipment file. Overrides salvage value in D-A EQPSPL file.	F4.2	29-32
YEQRPR	Optional repair percentage Overrides repair percentage in D-A EQPSPL file.	F4.2	34-37
METHOD	Optional depreciation method. Default is str-aignt line. ...unless changed in FNCL agendum, in which case leave blank. See Table 5.01.	I2	39-40
DBLPCT	Optional accelerated dep-eciation percentage code. Default set at 2.	I1	42
ORCDWN	Optional downpayment per-centage. Default set at 0.00 (0%) unless changed in FNCL agendum, in which case leave blank.	F4.2	44-47

END* (col. 1-4, last card).

****
*
*6.12. Agendum: MACH (col. 1-4, 1st card)
*
****

Comment: The user may include as many Data Cards 1, 2, and 3 as necessary.

Data Card 1: Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A MACHIN file code " 3 ".	A4	1- 4

IROW	D-A MACHIN file row number for input item.	I4	5- 8
NUMBER	Quantity of item used.	I6	10-15
ICODE	Fuel and repair code. See Table 5.15	I1	17
YMAPRC	Optional unit price. Overrides unit price in D-A MACHIN file.	I6	19-24
YYRSWN	Optional life of item in D-A MACHIN file. Overrides unit life in D-A MACHIN file.	I2	26-27
YSLPCT	Optional salvage value of item in D-A MACHIN file. Overrides salvage value in D-A MACHIN file.	F4.2	29-32
METHOD	Optional depreciation method. Default is straight line. ...unless changed in FNCL agendum, in which case leave blank. See Table 5.01.	I2	34-35
DBLPCT	Optional accelerated depreciation percentage code. Default set at 2.	I1	37
OPCDWN	Optional downpayment percentage. Default set at 0.00 (0%) unless changed in FNCL agendum, in which case leave blank.	F4.2	39-42
YRPPCT	Optional annual repair percentage. Overrides repair percent in D-A MACHIN file.	F4.2	44-47

Data Card 2: If ICODE from data card 1 is equal to 1 OR 2, omit this card. All items on this card automatically default to 0.083 per month.

Variable Name	Description	Format	Column
OMTPCT(1)	Monthly percent annual hours for January.	F4.2	5- 8
OMTPCT(2)	Monthly percent annual hours for February.	F4.2	10-13
OMTPCT(3)	Monthly percent annual hours for March.	F4.2	15-18
OMTPCT(4)	Monthly percent annual hours for April.	F4.2	20-23
OMTPCT(5)	Monthly percent annual hours for May.	F4.2	25-28
OMTPCT(6)	Monthly percent annual hours for June.	F4.2	30-33
OMTPCT(7)	Monthly percent annual hours for July.	F4.2	35-38
OMTPCT(8)	Monthly percent annual hours for August.	F4.2	40-43
OMTPCT(9)	Monthly percent annual hours for September.	F4.2	45-48
OMTPCT(10)	Monthly percent annual hours for October.	F4.2	50-53
OMTPCT(11)	Monthly percent annual hours for November.	F4.2	55-58
OMTPCT(12)	Monthly percent annual hours for December.	F4.2	60-63

Data Card 3: If fuel is calculated by this agendum, this card must be included. Note: ICODE in data card 1 should be 4, 5, or 6.

Variable Name	Description	Format	Column
CONTRL	D-A PRICEV file code " 7 ".	A4	1- 4

IROW	D-A PRICEV file row number per unit fuel price.	I4	5- 8

END* (col. 1-4, last card).

****
*
*6.13. Agendum: PMEN (col. 1-4, 1st card) *
*
****

Data Card 1: This card must be included even if all is left blank except ICODE.

Variable Name	Description	Format	Column
ICODE	See Fuel and Repair code. Table 5.13.	I1	5
IDYSXC(1)	Estimated number of days that water will be exchanged through the system in January.	I2	7- 8
IDYSXC(2)	Estimated number of days that water will be exchanged through the system in February.	I2	9-10
IDYSXC(3)	Estimated number of days that water will be exchanged through the system in March.	I2	11-12
IDYSXC(4)	Estimated number of days that water will be exchanged through the system in April.	I2	13-14
IDYSXC(5)	Estimated number of days that water will be exchanged through the system in May.	I2	15-16
IDYSXC(6)	Estimated number of days that water will be exch-	I2	17-18

	anged through the system in June.		
IDYSXC(7)	Estimated number of days that water will be exchanged through the system in July.	I2	19-20
IDYSXC(8)	Estimated number of days that water will be exchanged through the system in August.	I2	21-22
IDYSXC(9)	Estimated number of days that water will be exchanged through the system in September.	I2	23-24
IDYSXC(10)	Estimated number of days that water will be exchanged through the system in October.	I2	25-26
IDYSXC(11)	Estimated number of days that water will be exchanged through the system in November.	I2	27-28
IDYSXC(12)	Estimated number of days that water will be exchanged through the system in December.	I2	29-30

Note: The following data should be entered on a percentage basis.

PCTXCH(1)	Estimated maximum average daily exchange rate for the system for the month of January.	F4.2	32-35
PCTXCH(2)	Estimated maximum average daily exchange rate for the system for the month of February.	F4.2	36-39
PCTXCH(3)	Estimated maximum average daily exchange rate	F4.2	40-43

	for the system for the month of March.		
PCTXCH(4)	Estimated maximum average daily exchange rate for the system for the month of April.	F4.2	44-47
PCTXCH(5)	Estimated maximum average daily exchange rate for the system for the month of May.	F4.2	48-51
PCTXCH(6)	Estimated maximum average daily exchange rate for the system for the month of June.	F4.2	52-55
PCTXCH(7)	Estimated maximum average daily exchange rate for the system for the month of July.	F4.2	56-59
PCTXCH(8)	Estimated maximum average daily exchange rate for the system for the month of August.	F4.2	60-63
PCTXCH(9)	Estimated maximum average daily exchange rate for the system for the month of September.	F4.2	64-67
PCTXCH(10)	Estimated maximum average daily exchange rate for the system for the month of October.	F4.2	68-71
PCTXCH(11)	Estimated maximum average daily exchange rate for the system for the month of November.	F4.2	72-75
PCTXCH(12)	Estimated maximum average daily exchange rate for the system for the month of December.	F4.2	76-79

Data Card 2: Leave blank any optional values not used

Variable Name	Description	Format	Column
CONTRL	D-A PUMPCM file code " 8 ".	A4	1- 4
IROW	D-A PUMPCM file row number for input item.	I4	5- 8
NBRPMP	Quantity of pumps used. (Assume all of same size).	I6	10-15
LIFE	Pump and driver life. Must be read in by user, and be in common.	I2	17-18
SALVAG	Optional salvage value of item. Overrides default value of 0.00.	F4.2	20-23
METHOD	Optional depreciation method. Default is st-raight line. ...unless changed in FNCL agendum, in which case leave blank. See Table 5.01.	I1	25
DBLPCT	Optional accelerated dep-reciation percentage code. Default set at 2.	I1	27
OPCDWN	Optional downpayment per-centage. Default set at 0.00 (0%) unless changed in FNCL agendum, in which case leave blank.	F4.2	29-32
YPRICP	Optional unit price of item. Overrides unit price in D-A PUMPCM file.	I6	34-39
ITTLVO	Optional total water volume. If subagendum GIVN was used, enter total water volume here. If subagendum CALC was used leave blank.	I8	41-48

Data Card 3: Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A POWERC file code " 6 ".	A4	1- 4
IROW	D-A POWERC file row number. for input item.	I4	5- 8
NBRENG	Number of engines	I6	10-15
YPRICE	Optional engine price	I6	17-22

Data Card 4: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 ".	A4	1- 4
IROW	Row 5 in D-A PARMTR file for pump efficiency.	I4	5- 8
TOTHED	Total dynamic pumping head in feet.	I3	10-12
YPEFF	Optional pump efficiency value. If used, leave IROW blank.	F4.2	14-17

Data Card 5: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 "	A4	1- 4
IROW	D-A PARMTR file row number	I4	5- 8
YEEFF	Optional engine efficiency. If used, leave IROW blank.	F4.2	10-13

Data Card 6: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 ".	A4	1- 4
IROW	D-A PARMTR file row number.	I4	5- 8
YBTU	Optional BTU's for pump fuel. If used, leave IROW blank.	I6	10-15

Data Card 7: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PRICEV file code " 7 ".	A4	1- 4
IROW	D-A PRICEV file row number	I4	5- 8
YFUPRC	Optional fuel price. If used, leave IROW blank.	F5.2	10-14

END* (col. 1-4, last card).

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**********************************************
*                                            *
*6.14.  Agendum: PMPC (col. 1-4, 1st card)   *
*                                            *
**********************************************
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Data Card 1:

Variable Name	Description	Format	Column
ICODE	Refer to Fuel and Repair Table 5.13.	I4	5
IDYSXC(1)	Estimated number of days that water will be exchanged through the system in January.	I2	7- 8
IDYSXC(2)	Estimated number of days that water will be exchanged through the system in February.	I2	9-10

IDYSXC(3)	Estimated number of days that water will be exchanged through the system in March.	I2	11-12
IDYSXC(4)	Estimated number of days that water will be exchanged through the system in April.	I2	13-14
IDYSXC(5)	Estimated number of days that water will be exchanged through the system in May.	I2	15-16
IDYSXC(6)	Estimated number of days that water will be exchanged through the system in June.	I2	17-18
IDYSXC(7)	Estimated number of days that water will be exchanged through the system in July.	I2	19-20
IDYSXC(8)	Estimated number of days that water will be exchanged through the system in August.	I2	21-22
IDYSXC(9)	Estimated number of days that water will be exchanged through the system in September.	I2	23-24
IDYSXC(10)	Estimated number of days that water will be exchanged through the system in October.	I2	25-26
IDYSXC(11)	Estimated number of days that water will be exchanged through the system in November.	I2	27-28
IDYSXC(12)	Estimated number of days that water will be exch-	I2	29-30

	anged through the system in December.		
PCTXCH(1)	Estimated maximum average daily exchange rate for the system for the month of January.	F4.2	32-35
PCTXCH(2)	Estimated maximum average daily exchange rate for the system for the month of February.	F4.2	36-39
PCTXCH(3)	Estimated maximum average daily exchange rate for the system for the month of March.	F4.2	40-43
PCTXCH(4)	Estimated maximum average daily exchange rate for the system for the month of April.	F4.2	44-47
PCTXCH(5)	Estimated maximum average daily exchange rate for the system for the month of May.	F4.2	48-51
PCTXCH(6)	Estimated maximum average daily exchange rate for the system for the month of June.	F4.2	52-55
PCTXCH(7)	Estimated maximum average daily exchange rate for the system for the month of July.	F4.2	56-59
PCTXCH(8)	Estimated maximum average daily exchange rate for the system for the month of August.	F4.2	60-63
PCTXCH(9)	Estimated maximum average daily exchange rate for the system for the month of September.	F4.2	64-67

PCTXCH(10)	Estimated maximum average daily exchange rate for the system for the month of October.	F4.2	68-71
PCTXCH(11)	Estimated maximum average daily exchange rate for the system for the month of November.	F4.2	72-75
PCTXCH(12)	Estimated maximum average daily exchange rate for the system for the month of December.	F4.2	76-79

Data Card 2: Leave blank any optional values not used.

ENCODE	Pump engine type code. See Table 5.04.	I1	5
PMCODE	Pump type code. See Table 5.03.	I1	7
IXCHNG	Total water exchange rate for system. Enter .10 for 10%.	F4.2	9-12
TOTHED	Total pumping head in feet.	I3	14-16
LIFE	Life for loan and depreciation computation.	I2	18-19
SALVAG	Optional salvage value of item. Overrides default value of 0.00.	F4.2	21-24
METHOD	Optional depreciation method. Default is straight line. ...unless changed in FNCL agendum, in which case leave blank. See Table 5.01.	I1	26
DBLPCT	Optional accelerated depreciation percentage code. Default set at 2.	I1	28

OPCDWN	Optional downpayment percentage. Default set at 0.00 (0%) unless changed in FNCL agendum, in which case leave blank.	F4.2	30-33

Data Card 3: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optinal values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 ".	A4	1- 4
IROW	Select from D-A PARMTR file row number.	I4	5- 8
YPEFF	Optional pump efficiency. If used, leave IROW blank.	F4.2	10-13

Data Card 4: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 ".	A4	1- 4
IROW	D-A PARMTR file row number. Rows 7-10.	I4	5- 8
YDEFF	Optional driver efficiency. Refer to Table 5.05. If used, leave IROW blank.	F4.2	10-13

Data Card 5: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 ".	A4	1- 4
IROW	D-A PARMTR file row number See rows 11-14.	I4	5- 8
YDRT	Optional derate factor. Refer to Table 5.06. If used, leave IROW blank.	F4.2	10-13

Data Card 6: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 ".	A4	1- 4
IROW	D-A PARMTR file row 6	I4	5- 8
YEEFF	Optional engine efficiency. If used, leave IROW blank.	F4.2	10-13

Data Card 7: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PARMTR file code " 5 ".	A4	1- 4
IROW	D-A PARMTR file row 15-17.	I4	5- 8
YBTU	Optional BTU's for fuel type. If used, leave IROW blank.	I6	10-15

Data Card 8: If ICODE from data card 1 equals 1 or 2 omit this card. Leave blank any optional values not used.

Variable Name	Description	Format	Column
CONTRL	D-A PRICEV file code " 5 ".	A4	1- 4
IROW	D-A PRICEV file row number	I4	5- 8
YFUPRC	Optional fuel price. If used, leave IROW blank.	F4.2	10-13

END* (col. 1-4, last card)

```
*********************************************
*                                           *
*6.15.  Agendum: PROD (col. 1-4, 1st card)  *
*                                           *
*********************************************
```

Comment: Use as many sets of data cards 1, 2, and 3 as needed.

Data Card 1:

Variable Name	Description	Format	Column
CONTRL	D-A HARVST file code " 2 ".	A4	1- 4
IROW	D-A HARVST file row number.	I4	5- 8
YCNVFC	Conversion factor to alter prices (by multiplication) in D-A PRICEV file (ie. heads-on to heads-off,etc). Default is equal to "1.0".	F4.2	10-13
IICODE	If optional prices are to be read-in, enter a 1; otherwise leave blank. If used, leave IROW blank.	I1	I5

Data Card 2: Leave blank any month for which no production occurs

Variable Name	Description	Format	Column
MTHQTY(1)	Monthly quantity of production for January.	I6	5-10
MTHQTY(2)	Monthly quantity of production for February.	I6	11-16
MTHQTY(3)	Monthly quantity of production for March.	I6	17-22
MTHQTY(4)	Monthly quantity of production for April.	I6	23-28
MTHQTY(5)	Monthly quantity of production for May.	I6	29-34
MTHQTY(6)	Monthly quantity of production for June.	I6	35-40
MTHQTY(7)	Monthly quantity of production for July.	I6	41-46
MTHQTY(8)	Monthly quantity of production for August.	I6	47-52
MTHQTY(9)	Monthly quantity of production for September.	I6	53-58

MTHQTY(10)	Monthly quantity of production for October.	I6	59-64
MTHQTY(11)	Monthly quantity of production for November.	I6	65-70
MTHQTY(12)	Monthly quantity of production for December.	I6	71-76

Data Card 3: User may alter the price of a single month or the total price array or any combination thereof. Omit this card if no optional prices are desired.

Variable Name	Description	Format	Column
YMHRVP(1)	Optional unit price for production for January.	F6.2	5-10
YMHRVP(2)	Optional unit price for production for February.	F6.2	11-16
YMHRVP(3)	Optional unit price for production for March.	F6.2	17-22
YMHRVP(4)	Optional unit price for production for April.	F6.2	23-28
YMHRVP(5)	Optional unit price for production for May.	F6.2	29-34
YMHRVP(6)	Optional unit price for production for June.	F6.2	35-40
YMHRVP(7)	Optional unit price for production for July.	F6.2	41-46
YMHRVP(8)	Optional unit price for production for August.	F6.2	47-52
YMHRVP(9)	Optional unit price for production for September.	F6.2	53-58
YMHRVP(10)	Optional unit price for production for October.	F6.2	59-64
YMHRVP(11)	Optional unit price for production for November.	F6.2	65-70

YMHRVP(12)	Optional unit price for production for December.	F6.2	71-76

END* (col. 1-4, last card)

****
*
*6.16. Agendum: GROW (col. 1-4, 1st card) *
*
****

Comment: This Agendum is for use in conjunction with a growth submodel. Omit this agendum and use PROD agendum if no growth submodel is available.

Data Card 1:

Variable Name	Description	Format	Column
SUBMOD	Growth submodel library code. See Table 5.12.	I2	5- 6
VALCOD	Item code of value needed from system design CALC subroutine, if required by growth submodel. See Table 5.11. Omit if system design CALC subroutine 1) doesn't produce needed information or 2) System design CALC subroutine is not used.	I2	8- 9
PRDCDE	Product description code See Table 5.14.	I2	11-12
VCFLAG	Variable cost computation code. See Appendix B. Enter 1 if variable costs are to be computed by growth submodel. Omit if variable costs units are not computed	I1	14

by the growth submodel. If VCFLAG is omitted, card 26 is omitted.

Data Card 2: This card can be read-in an unlimited number of times to supply the data necessary for satisfying the data requirements of the selected growth submodel. The information contained on data card 2A is specific to a given growth submodel and will depend upon the specific growth submodel employed. Data Card 2A should be included as many times as necessary to supply submodel data.

(Utilize columns 1-80 for necessary data).

Variable Name*	Description	Format	Column
1.1	These are dummy variables for use with hypothetical growth submodel. User must enter at least one data card 2.		
1.2	These are dummy variables for use with hypothetical growth submodel. User must enter at least one data card 2.		
1.N	These are dummy variables for use with hypothetical growth submodel. User must enter at least one data card 2.		

*Specific variable names are arbitrary.

Data Card 3: This card must be duplicated to obtain unit prices for all input items that are generated by the growth subroutine. Refer to Appendix B.

Variable Name	Description	Format	Column
CONTRL	D-A PRICEV file code " 7 ".	A4	1- 4
IROW	D-A PRICEV file row number input item.	I4	5- 8
IDCODE	Operating cost type code. See Table 5.08.	I2	10-11

END* (col. 1-4, last card).

****
*
*6.17. Agendum: VARC (col. 1-4, 1st card) *
*
****

Comment: The user may enter as many sets of Data Cards 1 and 2 as there are different types of variable cost items. When entering labor however, Data Cards 1 and 2 must be entered for each hourly employee.

Data Card 1:

Variable Name	Description	Format	Column
CONTRL	Variable input type keyword. See Table 5.07.	A4	1- 4
MTHQTY(1)	Monthly quantity of item used in January.	I7	9-15
MTHQTY(2)	Monthly quantity of item used in February.	I7	17-23
MTHQTY(3)	Monthly quantity of item used in March.	I7	25-31

MTHQTY(4)	Monthly quantity of item used in April.	I7	33-39
MTHQTY(5)	Monthly quantity of item used in May.	I7	41-47
MTHQTY(6)	Monthly quantity of item used in June.	I7	49-55

Data Card 2: This card must be read in regardless of whether a quantity of variable cost item is used in July-August.

Variable name	Description	Format	Col.
CONTRL	D-A PRICEV file code " 7 ".	A4	1- 4
IROW	D-A PRICEV file row number for input item.	I4	5- 8
MTHQTY(7)	Monthly quantity of item used in July.	I7	9-15
MTHQTY(8)	Monthly quantity of item used in August.	I7	17-23
MTHQTY(9)	Monthly quantity of item used in September.	I7	25-31
MTHQTY(10)	Monthly quantity of item used in October.	I7	33-39
MTHQTY(11)	Monthly quantity of item used in November.	I7	41-47
MTHQTY(12)	Monthly quantity of item used in December.	I7	49-55
YPRCST	Optional price of item in PRICEV file. If used, leave IROW blank.	F7.2	57-63

END* (col 1-4 last card)

****
*
*6.18. Agendum: OVHD (col. 1-4, 1st card)
*
****

Data Card 1: The user should use as many Data Card 1's as necessary. Leave blank any month for which no overhead costs occur.

Variable Name	Description	Format	Column
CONTRL	D-A OVERHD file code " 4 ".	A4	1- 4
IROW	Row number for overhead costs.	I4	5- 8
MONTH(1)	Enter "1" to have overhead cost occur in January.	I1	10
MONTH(2)	Enter "1" to have overhead cost occur in February.	I1	12
MONTH(3)	Enter "1" to have overhead cost occur in March.	I1	14
MONTH(4)	Enter "1" to have overhead cost occur in April.	I1	16
MONTH(5)	Enter "1" to have overhead cost occur in May.	I1	18
MONTH(6)	Enter "1" to have overhead cost occur in June.	I1	20
MONTH(7)	Enter "1" to have overhead cost occur in July.	I1	22
MONTH(8)	Enter "1" to have overhead cost occur in August.	I1	24
MONTH(9)	Enter "1" to have overhead cost occur in September.	I1	26
MONTH(10)	Enter "1" to have overhead cost occur in October.	I1	28
MONTH(11)	Enter "1" to have overhead cost occur in November.	I1	30

MONTH(12)	Enter "1" to have over-head cost occur in December.	I1	32
MYVAL	Optional value for over-head item. If used, leave IROW blank.	I6	34-39

END* (col. 1-4, last card)

****
*
*6.19. Agendum: SLRY (col. 1-4, 1st card)
*
****

COMMENT: You "must" use the SLRY agendum whether entering data cards or not.

Data Card 1: The user should use as many Data Card 1's as necessary. Leave blank any month for which no salary cost occurs.

Variable Name	Description	Format	Column
CONTRL	D-A OVERHD file code " 4 ".	A4	1- 4
IROW	Row number in D-A OVERHD file.	I4	5- 8
MANGRS	Numbered of salaried employees at a given salary level.	I2	10-11
MONTH(1)	Enter "1" to have salary cost occur in January.	I1	13
MONTH(2)	Enter "1" to have salary cost occur in February.	I1	15
MONTH(3)	Enter "1" to have salary cost occur in March.	I1	17
MONTH(4)	Enter "1" to have salary cost occur in April.	I1	19
MONTH(5)	Enter "1" to have salary cost occur in May.	I1	21

MONTH(6)	Enter "1" to have salary cost occur in June.	I1	23
MONTH(7)	Enter "1" to have salary cost occur in July.	I1	25
MONTH(8)	Enter "1" to have salary cost occur in August.	I1	27
MONTH(9)	Enter "1" to have salary cost occur in September.	I1	29
MONTH(10)	Enter "1" to have salary cost occur in October.	I1	31
MONTH(11)	Enter "1" to have salary cost occur in November.	I1	33
MONTH(12)	Enter "1" to have salary cost occur in December.	I1	35
MYVAL	Optional value for overhead item. Leave blank if no optional value is desired. If used, leave IROW blank.	I6	37-42

END* (col. 1-4, last card)

****
*
*6.20. Agendum: BUD1 (col. 1-4, 1st card)
*
****

Data Card 1:

Variable Name	Description	Format	Column
IOPTN	Technical unit code. Enter "1" for output to be expressed on a per total basis. Enter "2" is for output to be expressed on a per technical unit basis. If this card is repeated due to the KYCODE variable this variable should appear only on the first data card.	I1	5

KYCODE	Variable cost type code. See Table 5.08. Only use this variable if SPC1,SPC2,SPC3, SPC4, or SPC5 was used in the VARC agendum. Enter as many Data Card 1's as specific headings are used (maximum of 5).	I2	7- 8
MYTITL	Optional subheading. Enter only if used SPC1-SPC5 in VARC agendum and KYCODE is used.	8A4	10-41

END* (col. 1-4, last card)

****
*
*6.21. Agendum: BUD2 (col. 1-4, 1st card) *
*
****

Data Card 1:

Variable Name	Description	Format	Column
IOPTN	Technical unit or total code. "1" for output to be expressed on a per total basis. "2" is for output to be expressed on a per technical unit basis.	I1	5

END* (col. 1-4, last card)

****
*
*6.22. Agendum: BUD3 (col. 1-4, 1st card) *
*
****

Data Card 1:

Variable Name	Description	Format	Column
IOPTN	Technical unit or total code. "1" for output to be expressed on a per total basis. "2" is for output to be expressed on a per technical unit basis.	I1	5

END* (col. 1-4, last card)

STORED BUDGETS

The BSP can take a workable control sequence and store it as a "BUDGET" on a stored budget master file. This "BUDGET" can then be recalled, have temporary or permanent modifications done to it, be used in a run of the BSP, and be re-stored as a new budget with the permanent modifications. This section details how to construct the necessary control sequence to execute any of these functions with stored budgets.

The use of a stored budget gives the user three basic capabilities. First, the user has a way to add to, delete from, condense and list the stored budget master file. Combinations of these functions also are possible. Second, the user can retrieve a stored budget from the master file, run the retrieved budget, modify it and then run the "new" budget. Third, the user can store the modified version of the retrieved budget as an entirely new stored budget.

There are five basic options for management of the stored budget master file. These include adding a new budget, listing stored budgets, deleting stored budget(s) or parts of budget(s), and condensing the stored budget file. A fifth option is the combination of the four basic options.

OPTION #1 - Adds a new stored budget to the stored budget file, only. This option automatically gives a file listing.

		Format	Column
Card 1	SBPR	A4	1-4
Card 2	ADD	A4	5-8
	Budget code name (B-----). Include the "B" and a unique 3 digit number, e.g. "B001").	A4	10-13
Card 3	END*	A4	1-4
Cards	Control-stream to be stored		

OPTION #2 Lists the stored budget file, only.

		Format	Column
Card 1	SBPR	A4	1-4
Card 2	LIST	A4	5-8
Card 3	END*	A4	1-4

The stored budget master file listing contains three sets of information: (1) "ROW NUMBER". (2) "COLS 1-4" and (3) "COLS 5--------84".

ROW NUMBER contains the absolute row number of the file.

COLS 1-4 contains the relative row number of each stored budget. Row "1" of each budget contains the budget code name "B " only. Row "2" begins the actual budget.

COLS 5-----84 contain the stored budget.

OPTION #3 - Delete one section of contiguous lines from the stored budget, only.

		Format	Column
Card 1	SBPR	A4	1-4
Card 2	DLET	A4	5-8
Card 3	The beginning absolute "ROW NUMBER" of the budget which is to be deleted from. That is, this row always contains the budget code name (B).	I4	5-8
	The beginning relative row number "COL 1-4" of the lines that are to be deleted.	I4	10-13
	The ending relative row number "COL 1-4" of the lines that are to be deleted.	I4	15-18
Card 4	END*	A4	1-4

OPTION #4 - Condense the stored budget master file, only.

		Format	Column
Card 1	SBPR	A4	1-4
Card 2	COND	A4	5-8
Card 3	END*	A4	1-4

When you delete lines from the stored budget master file it produces "holes" in the file. The user will want to condense the file to get rid of these holes. NOTE: When this is done all of the lines in the stored budget master file are renumbered.

OPTION #5 - Combining two or more of the above four options Combining the above options must always be done in the following order.

		Format	Column
Card 1	SBPR	A4	1-4

1. Deletions enter Card 2 from Option #3 as many times as needed.

2. Condensing enter Card 2 from Option #4 once only.

3. Additions enter Card 2, Card 3 and new budget cards to be added from Option #1. Only one new budget at a time can be added.

4. List enter Card 2 for Option #2.

NOTE: These must always appear in the above order.

Running Retrieved Budgets

This section is to be used when making runs with a budget retrieved from the stored budget master file. Four options are available to the user for running a retrieved budget from the stored budget master file. These are (1) retrieving and running a budget from the stored budget master file, (2) inserting a new section within the retrieved budget and running the modified budget, (3) performing multiple inserts within a retrieved budget and running the modified budget, and (4) deleting sections from a retrieved budget and running the budget.

OPTION "1 - Retrieving and running a budget from the stored budget master file with no modifications.

		Format	Column
Card 1	SBFL	A4	1-4
Card 2	SBGT	A4	1-4
Card 3	The beginning absolute "ROW NUMBER" of the budget to be retrieved.	I4	5-8
	The beginning relative row number "COLS 1-4" of the budget to be retrieved. NOTE: Usually this relative row number is "2" because "1" always contains the budget code name and is not retrieved.	I4	10-13
	The last relative row number "COLS 1-4" of the budget to be retrieved.	I4	15-18
Card 4	END*	A4	1-4
Card 5	STOP	A4	1-4

OPTION #2 - Inserting a new section within a retrieved budget and run the modified budget.

		Format	Column
Card 1	SBFL	A4	1-4
Card 2	SBGT	A4	1-4
Card 3	The beginning absolute "ROW NUMBER" of the budget to be retrieved.	I4	5-8
	The beginning relative row number "COLS 1-4" of the budget to be retrieved. NOTE: Usually this row is equal to "2" for first insertion.	I4	10-13
	The last relative row number "COLS 1-4" prior to the entry of the new data	I4	15-18
Card 4	SB++	A4	1-4
Cards	Data cards to be inserted into the stored budget		
Card 5	SB—	A4	1-4
Card 6	The beginning absolute "ROW NUMBER" of the budget to be retrieved. NOTE: Same as Cols. 5-8 on Card 3.	I4	5-8
	The first relative row number "COLS 1-4 of the remaining section of the budget being retrieved.	I4	10-13
	The last relative row number "COLS 1-4" of the budget being retrieved.	I4	15-18
Card 7	END*	A4	1-4
Card 8	STOP	A4	1-4

OPTION #3 - Multiple inserts within a retrieved budget
This is the same as Option #2 except cards 3 through 5 are repeated for as many inserts as needed. Notice: Use Cards 1 and 2, then the multiple inserts, and conclude with cards 6, 7, and 8.
NOTE: If an insert is at the end of the budget conclude with cards 7 and 8.

OPTION #4 - Delete a section within a retrieved budget and run the modified budget

		Format	Column
Card 1	SBFL	A4	1-4
Card 2	SBGT		
Card 3	The beginning absolute "ROW NUMBER" of the budget being retrieved.	I4	5-8
	The beginning relative row number "COLS 1-4" of the budget being retrieved. NOTE: Usually this row number is equal to "2" for the first deletion.	I4	10-13
	The last relative row number "COLS 1-4" prior to be deleted.		
Card 3	END*	A4	1-4
Card 4	The beginning of absolute "ROW NUMBER" of the budget being retrieved. NOTE: Same as Cols. 5-8 on Card 3.	I4	5-8
Card 5	The first relative row number "COLS 1-4" of the remaining section of the budget being retrieved.	I4	10-13
	The last relative row number "COLS 1-4" of the budget being retrieved.	I4	15-18
Card 6	END*	A4	1-4
Card 7	STOP	A4	1-4

OPTION #5 - Multiple deletions within a retrieved budget.

This is the same as Option #4 except cards 3 through 5 are repeated for as many deletions as needed. Notice: Use cards 1 and 2, then the multiple inserts, and follow with Cards 6 and 7.

Storing a Modified Retrieved Budget

The only function of this section is to allow the user to store a modified retrieved budget as a new stored budget. The user should initially test-run the modified retrieved budget by using the capabilities of the Running and Retrieved Budgets section. When the modifications produce an error-free run, the modified version is ready for storage in the stored budget master file.

		Format	Column
Card 1	SBFL	A4	1-4
Card 2	SBPR	A4	1-4
Card 3	ADD	A4	5-7
	Budget Code Name (B------)	A4	10-13
Card 4	END*		
Cards	Any one of the options from the Running and Retrieved Budgets section. However, the SBFL card must be omitted from these.		

APPENDICES

Appendix A: System Design Subroutines

The BSP is designed to allow the user to include system design subroutines (SDS) that compute the quantity of input units involved in constructing the physical facility, and compute the size of the operation elements of the vector "A" discussed with the CALC subagendum. Each SDS computes the number of units of input for only a specific system design. Each SDS should be designed, however, so that a wide range of facility sizes for that design can be examined.

Each new SDS will be included as a separate subroutine (as are the growth submodels). Any SDS can be included provided it is written in FORTRAN H-extended compatible code.

The following discusses the compatibilities of the SDS, and the requirements and procedures for including a new SDS in the BSP.

General SDS Capabilities

The SDS has only two basic functions: (1) to provide estimates of the quantity of input units (i.e., cubic yards of dirt, gravel, concrete, etc.) necessary to construct the physical facility (i.e., ponds, raceways, tank systems, etc.), and (2) to compute the size of the operation in a variety of terms (i.e., total area, total area per production unit, total water surface area, etc.) to be stored in the previously discussed vector "A."

The quantity values of facility construction input items are stored

in a vector in a documented order (each SDS should be documented by the user) and multiplied with the appropriate per unit prices via the CALC subagendum. The costs are estimated for the beginning of year 1.

The facility size values produced by a given SDS can be any value desired. There can be up to 10 values computed and stored in the vector. The BSP uses these values in two ways: (1) selecting one of the ten values for use as the technical unit basis of the output (i.e., total cost per acre), and (2) selecting one of the ten values for use by a growth submodel in computing production and variable costs.

Code Requirements for SDS Inclusion

There are certain program code requirements that must be met when inserting an SDS in the BSP. This allows any SDS to be compatible with the BSP. The BSP must be pulled out of binary compile and the FORTRAN H-extended code must be modified.

Data Requirements for Running SDS -- Each SDS will be unique in terms of its data input requirements. Each will have different data necessary for proper execution. Refer to the CALC subagendum and data card 2. This card(s) supplies the data necessary to run the SDS. The SDS must, therefore, have a set of read statements included in the code to read the data from the data card 2's. The user should ensure that the data entered on the data card 2's match the format and dimensioning of the read statements in the SDS. The particular SDS is selected by using variable IROWD on data card 1 in the CALC subagendum.

Facility Construction Input Items -- As the quantity values for facility construction input items are computed, they are stored in a documented order (not necessarily the same for each SDS and user-docu-

mented) in a real array, (CALVAL (I), I = 1, 100) where I is the number of item types allowed in the array. There can be up to 100 elements. Therefore, the user should include a section of code that assigns each quantity of input items and I value in the CALVAL array. CALVAL is a real array and must be found in each SDS. The order in which these values are stored and documented for a given SDS should never be altered. If the order is altered, the changes must be documented. These values are then passed from the SDS back into the main simulator program where they are matched with a set of per unit prices from the D-A PRICEV file. The items in CALVAL are matched with D-A PRICEV file prices in the CALC subagendum by use of data card 3's.

Facility Size Values -- The facility size values are stored in an integer array. (IUNSIZ (I), I - 1, 10), where I is the number of elements in the array. Each SDS can compute facility size values with different logical definitions. These values must be documented in terms of definition and order in which the values are stored in IUNSIZ. Therefore, each SDS must have a section of code that computes these values and stores them in the IUNSIZ array. The code also must exist to retrieve a single one of these values from the array and assign this value to the real variable SIZE. The integer variable RESULT (CALC subagendum, data card 1) is used to select this single item from the IUNSIZ array. Therefore, the user should include integer variable RESULT in the SDS and the code necessary to retrieve the i^{th} value from the IUNSIZ array based on the value RESULT (I = RESULT). The value selected is then assigned to the real variable SIZE and transferred out of the SDS for use elsewhere in the program. Note: This code must exist in the SDS. A final require-

ment of the SDS is to compute a value for the total water volume of the entire system (used for culture purposes) at any given point in time. The value is stored in integer variable TOTALV. Therefore, the code must exist in the SDS to derive this value. The TOTALV value is used by either the PMEN or PMPC agenda for cost computation.

Placing an SDS into the Simulator -- When placing an SDS into the simulator, it is included as another subroutine. Refer to Table 5.12.

An SDS is called by the variable IROWD which is read in on data card 1 of the CALC subagendum. IROWD is used as an index of the computed go-to-statement found in the SYSCAL subroutine. Note the argument list for the first SDS. Every new SDS added should have the same argument list. TOTALV is passed from the SDS. SIZE is passed from the SDS as are arrays CALVAL and RESULT.

The dimensioning for CALVAL must appear in each SDS. RESULT also must be set to integer. Finally, IUNSIZ must be passed in the labeled common, IUNIT. This common label name must be used.

Appendix B: Growth Model Subroutines

The budget simulator is designed to allow the user to utilize growth models to compute production, variable costs and certain technical data. These growth models may utilize any nature of modeling procedure and data, but they must be written in FORTRAN H-extended compatible code. The user must provide the growth models as separate modeling entities which are included as subroutines. The BSP must be pulled out of binary compile code for modifications.

The following outlines the capabilities of the growth models, and the code requirements needed to insert a growth model into the BSP.

General Growth Model Capabilities

Growth models can be included in the BSP for a variety of purposes. They can be used to compute production, variable costs on units of variable input and technical data for computation of fuel costs for water exchange by the BSP. Other information transfer from the BSP to the growth model is included in this production.

Production -- Production computed by a growth model must be for a single species only. There can be a size distribution of up to 25 different species, however. Production may be in terms of units of production (pound, kilograms, etc.) or in terms of value. Whether in terms of units or value, this monthly production value is matched with a set of monthly per unit prices ($1.00 if production is in terms of value) for each size used in the size distribution.

Variable Cost -- Variable cost computation also is on a monthly basis. The values can be in terms of units or cost for up to 25 different variable input items. The monthly values for each input item are matched with an annual per unit price. As with production, if the values are in terms of dollars, the annual prices matched will be $1.00. Therefore, a growth model can produce monthly estimates of units of feed, labor, fertilizer, fuel, etc., incurred during production and have these values displayed with the appropriate per unit prices in the budget output. Any type of variable input may be included.

Technical Data -- Technical data computations which growth models are allowed to produce are concerned with water exchange requirements. The capability allows the growth model to provide feedback on water exchange requirements to the BSP for selecting an adequate pumping sys-

tem and computing monthly fuel costs associated with water exchange. This feedback information is in the form of maximum daily exchange rate per month, and pumping days per month. There also is the built-in capacility of moving information (regarding facility size) from the BSP to the growth model.

Although the growth model must provide the production data, the variable cost and technical data on water exchange requirements are optional.

Code Requirements for Growth Submodel Inclusion

The BSP has been designed to accept virtually any growth model written in FORTRAN H-extended compatible code. There are small sections of code which must exist in every growth model prior to being added as a subroutine of the BSP. The data necessary to run the growth model and the three previously discussed capabilities require small sets of code which must exist in the growth model.

The following describes how to prepare the model for each capability prior to inclusion in the BSP. The modifications must be performed for each capability required by the user.

Data Input for Growth Model -- Each growth model will undoubtedly be unique. Each will have different data requirements for execution. Refer to the GROW agendum and data card 2. This card(s) contains the data necessary to run the growth model. The growth model must have a set of READ statements included in the code to read this data from the data card 2(s). The user should ensure that the READ statements have the proper format and dimensioning. The particular growth model is selected by data card 1 in the GROW agendum.

Production -- Production is on a monthly basis for up to 25 different sizes for a given species. This monthly production value must be matched with a monthly price for the proper size of the selected species. This must be repeated for each size class harvested.

As discussed in the GROW and PROD agenda, the monthly prices for production are found in the D-A HARVST file. The user first should refer to this file. Are the appropriate prices by month and size class found? If not, they should be included in the proper format. In any case, the user should observe what prices are available. The user should include a section of code in the growth model which places each monthly production value in a running total in the proper month and size class. These totals are stored in an integer array IPRDLB (I,J), I = 1, 25), J = 1, 12, where I is the size class dimension and J is the month dimension. Each production value should be given an appropriate I and J designation and added to the proper total. For production, therefore, each growth model should have (1) IPRDLB in a COMMON statement and (2) a section of code which tests each production value for size class and month and places that value in the appropriate total (I, J) in the array IPRDLB. The array will then be passed from the growth model and matched with the appropriate prices from the D-A HARVST file. The user selects the species by indicating with the proper code on data card 1 of the GROW agendum.

Variable Cost -- The variable input units or values are stored by month and item type. The values are then matched against a per unit price from the D-A PRICEV file.

The values are stored in an integer array, IPRDQT(I, J), I = 1, 25), J - 1, 12), where I is the variable input type and J is the month. There

may be up to 25 different types of variable input items produced by the growth model. When these values are produced they must be given an I value and stored in a documented order by month within the IPRDQT array. Therefore, if variable costs are to be used from the growth model, each growth model should (1) contain IPRDLB in a COMMON statement, and (2) have a section of code which assigns the units of values of variable input items in I value and places these values in the IPRDQT array. VCFLAG on data card 1 of the GROW agendum also should be set to "1" if variable costs are to be used.

The user can refer to the documented order in which the items are stored in the IPRDQT array and match these values with the corresponding per unit prices from the D-A PRICEV file. Refer to the GROW agendum, data card 3 for reading in the appropriate price(s). The user can use up to 25 data card 3(s) to match up to 25 variable input item types with the appropriate prices. The IPRDQT array must be found in a COMMON statement.

Technical Data -- Technical data is stored in two 12-element vectors that contain the data by month.

The growth model can produce monthly estimates of the maximum daily exchange rate. The monthly values are then stored in a real vector (PCTXCH (I), I = 1, 12), where I is the months. The growth model also can produce the days per month (IDYSXC (I), I = 1, 12), where I is the month that rates are exchanged. If these data are needed, the user should ensure that the code is included to store the data into the proper vectors. Refer to the CALC subagendum, and recall the values that the system design subroutine can produce regarding facility size (total area, total water surface area, etc.). Also recall that these values are to be

stored in a vector, IUNSIX (I), I = 1, 10), with a given location (i.e., total area; I = 1, total water surface area; I = 3, etc.) where I is the variable VALCOD. If one of these values is needed by the growth model (i.e., total water surface area is needed for a paved-type production estimate), the I value may be passed into the model via an integer, variable VALCOD = 1. Therefore, the user must have the vector IUNSIZ established in COMMON in the model and have a set of the code that selects the proper (i^{th}) element, based on the value of VALCOD (I = VALCOD). This feature must be used for every growth model.

This information is then passed from the growth model and used by the PMEN and PMPC agenda. If PMEN is used and conditions 2, 3 or 4 are invoked (Table 5.13), the vectors IDYSXC and PCTXCH must be established and used by the growth model. If PMPC is used and conditions 2, 3 or 4 are invoked (Table 5.13), the two vectors must be established and used by the growth model.

Placing a Growth Model into the BSP

When placing a growth model into the BSP, the model should be included as a totally new subroutine in the program. The first growth model GMDL01 (limit 20) has been included. It is called by the variable SUBMOD being read in on data card 1 of the GROW agendum and is used as an index for a computed go-to statement. Review the argument list for the first growth model. Each new growth model added should have the same argument list. VALCOD is read in on data card 1 of the GROW agendum. These four arguments should be included whether used or not. The next growth model should have a call statement immediately following the initial growth model call statement and be referred to as GMDL02.

Refer to Table 5.12 for the growth model GMDL01. This is only a dummy model, but it will illustrate some things. The argument list must be included. VALCOD should be integer and must be included. The labeled COMMONS containing the arrays and vectors must be included in every growth model and the label names must never change.

Appendix C: Technical Computations

The following equations are used in computational procedures within the FORTRAN program. The equations compute fuel, lube and repair costs for the various machinery and equipment items the user may select.

Equipment Repairs are computed as follows:

Annual Repair = List Price * Annual Repair Percentage * Number of Items

Monthly Repair = Annual Repair/12

Machinery Repair can be computed two ways:

Annual Repair = List Price * Annual Repair Percentage of List Price * Number of Items

Monthly Repair = List Price * REP1 * REP2 * REP3 * Number of Items (Monthly Hours of Use/Hours in Life) * 200)

Where REP1 is the ration of total accumulated repairs to initial list price for the entire life of the machine; REP 2 and REP3 are two repair cost constants that combine to determine the shape of the repair rate curve. Values with explanation can be found in Oklahoma State University Research Report #P-719, June 1975. The user selects these values from the D-A PARMTR file. This version is used if more detailed monthly values are needed and if monthly hours of use are known. Sample values for REP1, REP2 and REP3 for selected machinery items follow.

	REP1	REP2	REP3
Tractor	1.20	.000631	1.60
Truck	.80	.000631	1.40
Plow	2.00	.002510	1.30
Disk	.650	.002510	1.80
Harrow	.650	.000251	1.80
Rotary Mower	.650	.002510	1.30

Machinery Fuel can be computed two ways:

Annual Fuel Cost = Annual Hours of use * List Price * Fuel Mult./1000 * Number of Items * Fuel Price

where fuel mult. is a multiplier which gives fuel consumption in gallons per hour per $1,000 of original list price of the item. The value of the multiplier depends on fuel type used. The user selects these values from the D-A PARMTR file. The same reference as that used for machine repair multipliers can be referred to for more information on fuel multipliers. This version is used if annual hours used is available.

Monthly Fuel Cost = Monthly Hours of Use * List Price * Fuel Mult./1000 * Number of Items * Fuel Price

This version is used if monthly hours of use is available. The annual total is the sum of these monthly values.

Machinery Lube Costs are computed as follows:

Monthly Lube Cost = Monthly Fuel Cost * Lube Multiplier

Where the lube multiplier is a percentage of the total fuel cost, the reference above discusses how this value is derived. This study uses a value of .15 or 15 percent as the lube multiplier.

Monthly Fuel Cost for Water Exchange is calculated as

MCPM - TOTALV * MON%/197.5/Number of Pump Drivers

where MCPM is average daily exchange rate (gallons per minute) for month. TOTALV is the total volume of water, MON% is the average percentage of TOTALV that needs to be exchanged per day during month, and 197.5 is a constant.

WHP + MGPM * TOTHED/3960.0.

where WHP is water horsepower, TOTHED is the total dynamic head of the system and 3960.0 is a constant.

FUELPD = WHP * (MTHHRS/IDYSXC) * 2547.0/(PMPEFF/100 * ENGEFF/100 * BTUGAL).

where FUELPD is the units of fuel required per day, MTHHRS is the hours of use per month, IDYSXC is the number of days that water will be exchanged for the month, 2547.0 is a constant, PMPEFF is the pumping efficiency, ENGEFF is the engine efficiency, and BTUGAL is the BTU's per gallon of fuel. The latter three values must be read from the D-A PARMTR file.

Monthly Fuel Cost = FUELPD * IDYSXC * Number of Pump Drivers * Fuel Price

Monthly Pump Repair is calculated as:

Monthly Repair = .5 * List Price * (Monthly Hours of Use/Hours of Life) * Number of Pump Units

where .5 is a constant.

Monthly Pump Driver Repair is calculated as:

Monthly Repair = EGMULT * Monthly Hours of Use * List Price * Number of Units

when EGMULT is the engine multiplier. This is found in the D-A PARMTR file.

Selection of Pump and Pump Driver is determined as follows:

MAXPGM = MXCHNG * TOTALV/192.5.

Where MAXPGM is the maximum gallons per minute exchange rate projected and MXCHNG is the maximum percentage exchange required on any given day,

WHP = TOTHED * MAXPGM/3960.0

Where WHP is water horsepower

BHP = WHP/PMPEFF * DRUEFF,

Where BHP is the brake horsepower required, PMPEFF is the pump efficiency and DRVEFF (Table 5.05) is the driver efficiency. These values can be read from the D-A PARMTR file.

PHP = BHP/DERATE

Where DERATE (Table 5.06) is a derate factor which can be found for various engine types.

The model selects a pump from the D-A PUMPCM file, given a value for MAXPGM. The model selects a pump driver from the D-A POWERC file given a value for PHP. Matches are found on values for gallon per minute and horsepower in the D-A PUMPCM and D-A POWERC files, respectively.